S7020

Version 1.0

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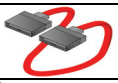
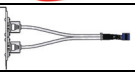
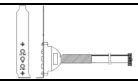
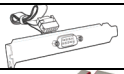
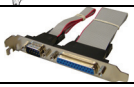
Before You Begin...

Check the box contents!

	1x S7020 motherboard
	1 x S7020 user's manual
	1 x S7020 Quick Reference guide
	1 x IO Shield Installation guide
	1 x TYAN driver CD
	1 x I/O shield
	6 x Serial ATA Cable
	1 x USB2.0 cable
	2 x mini SAS Cable (for S7020WAGM2NR only)
	1 x Audio cable (optional, P/N # 422774700001)
	3 x Serial ATA power cable (optional)
	1x Serial Port Cable (optional)
	1 x LPT-COM port bracket (optional)

If any of these items are missing, please contact your vendor/dealer for replacement before continuing with the installation process.

NOTE: Please contact your vendor for optional cables purchase.

NOTE

Chapter 1: Instruction

1.1 Congratulations

You have purchased one of the most powerful server solutions. Based on Intel® 5520 (36D) and Intel® ICH10/R chipsets, the S7020 is designed to support up to two Nehalem-EP 5500 Series processors and up to 96GB DDR3-800/1066/1333 memory, providing a rich feature set and incredible performance. Leveraging advanced technology from Intel, the S7020 is capable of offering scalable 32 and 64-bit computing, high-bandwidth memory design, and lightning-fast PCI-E bus implementation.

The S7020 not only empowers your company in today's demanding IT environment but also offers a smooth path for future application usage. All of this provides the S7020 the power and flexibility to meet the needs of nearly any server application.

Remember to visit TYAN's Website at http://www.tyan.com. There you can find information on all of TYAN's products with FAQs, online manuals and BIOS upgrades.

1.2 Hardware Specifications

TYAN S7020 (S7020WAGM2NR)

Processor	**Supported CPU Series**	Intel Xeon Processor 5500 Series
	Socket Type / Q'ty	LGA1366 / (2)
	Thermal Design Power (TDP) wattage	130W
Chipset	**IOH / ICH**	Intel 5520 / ICH10R
	Super I/O	Winbond W83627DHG
	PCI-X bridge	Intel 6702PXH-V
Memory	**Supported DIMM Qty**	(12) DIMM sockets
	DIMM Type / Speed	DDR3 800/1066/1333 RDIMM/UDIMM
	Capacity	Up to 96GB w/ dual rank RDIMMs
	Memory channel	6 Channels (3 Channels per CPU)
	Memory voltage	1.5V
Expansion Slots	**PCI-E**	(1) PCI-E x8 slot (w/ x4 link) / (1) PCI-E Gen.2 x16 slot / (1) PCI-E Gen.2 x8 slot
	PCI-X	(2) PCI-X 64-bit 133/100MHz slots

LAN	**Port Q'ty**		(2)
	Controller		Intel 82574L
Storage	**SAS**	**Connector**	(2) Mini-SAS connectors (support total 8 ports)
		Controller	LSI SAS1068E
		Speed	3.0 Gb/s
		RAID	RAID 0/1/1E (LSI Integrated RAID)
	SATA	**Connector**	(6) SATA
		Controller	ICH10R
		Speed	3.0 Gb/s
		RAID	RAID 0/1/10/5 (Intel Matrix RAID)
Graphic	**Connector type**		D-Sub 15-pin
	Resolution		1600x1200@60Hz
	Chipset		Aspeed AST2050
Audio	**Chipset**		Realtek ALC262
	Feature		HDA 2.0 spec compliant (pin header only)
Input /Output	**USB**		(9) USB2.0 ports (4 at rear, 4 via cable, 1 type A onboard)
	COM		(2) ports (1 at rear, 1 via cable)
	SAS		(2) Mini-SAS (4-in-1) connectors
	VGA		(1) D-Sub 15-pin VGA port
	Audio		(1) CD_IN header / (1) 2x5-pin front panel audio header / (1) 2x6-pin rear audio jack header
	RJ-45		(2) GbE ports
	LPT		(1) LPT header
	Power		SSI 24-pin + 8-pin + 8-pin power connectors / EPS12V
	Front Panel		(1) 2x12-pin SSI front panel header
	FDD		(1) FDD connector
	SATA		(6) SATA-II connectors
System Monitoring	**Chipset**		Winbond W83793G
	Voltage		Monitors voltage for CPU, memory, chipset & power supply
	Fan		Total (5) 4-pin headers / Total (5) 8-pin headers
	Temperature		Monitors temperature for CPU & system environment
	Others		Chassis intrusion detection / Watchdog timer support
Server Management	**Onboard Chipset**		Onboard Aspeed AST2050
	AST2050 IPMI Feature		IPMI 2.0 compliant baseboard management controller (BMC) / Supports storage over IP and remote platform-flash/ BIOS update / USB 2.0 virtual hub
	AST2050 iKVM Feature		24-bit high quality video compression / Dual 10/100 Mb/s MAC interfaces
BIOS	**Brand / ROM size**		AMI / 4MB
	Feature		Plug and Play (PnP) /PCI2.3 /WfM2.0 /SMBIOS2.3 /PXE boot / ACPI 2.0 power management /Power on mode after power recovery / User-configurable H/W monitoring

			/ Auto-configurable of hard disk types / Multiple boot options
Form Factor	**Form Factor**		SSI EEB
	Board Dimension		12”x13” (305x330mm)
Operating System	**OS supported list**		Please refer to our web site for the OS supported list. http://www.tyan.com/tech/os_support1.aspx
Regulation	**FCC (DoC)**		Class B
	CE (DoC)		Yes
Operating Environment	**Operating Temp.**		10° C ~ 35° C (50° F~ 95° F)
	Non-operating Temp.		- 40° C ~ 70° C (-40° F ~ 158° F)
	In/Non-operating Humidity		90%, non-condensing at 35° C
RoHS	**RoHS 6/6 Complaint**		Yes
Package Contains	**Motherboard**		(1) S7020 Motherboard
	Manual		(1) User’s manual / (1) Quick Ref. Guide / (1) IO Shield Installation Guide
	Installation CD		(1) TYAN installation CD
	I/O Shield		(1) I/O Shield
	Cable	**SATA**	(6) SATA signal cables
		SAS	(2) Mini-SAS (2x SFF-8470) cables (only for S7020WAGM2NR)
		USB	(1) CCBL-035J, 2-port USB bracket cable
Optional accessories for future upgrade	**Cable**		(1) CCBL-0615, COM port bracket cable / (1) CCBL-0311, SATA 1-to-2 power cable / (1) CCBL-035J, 2-port USB bracket cable / (1) CCBL-0613, 3-POS audio bracket cable / (1) LPT-COM port bracket cable

1.3 AST2050

Please visit the TYAN Web Site at http://www.tyan.com to download the latest AST2050 User’s Guide.

NOTE

Chapter 2: Board Installation

You are now ready to install your motherboard. The mounting hole pattern of the S7020 matches the SSI EEB specification. Before continuing with installation, confirm that your chassis supports an SSI EEB motherboard.

How to install our products right… the first time

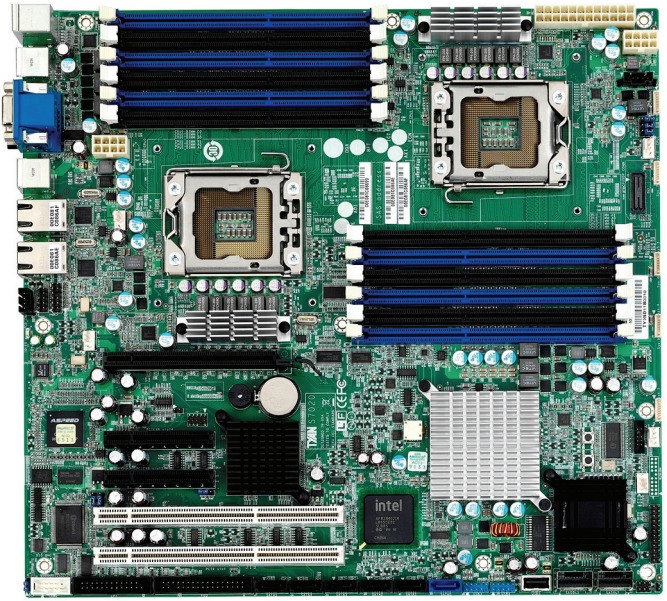
The first thing you should do is reading this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

Ground yourself properly before removing your motherboard from the antistatic bag. Unplug the power from your computer power supply and then touch a safely grounded object to release static charge (i.e. power supply case). For the safest conditions, TYAN recommends wearing a static safety wrist strap. Hold the motherboard by its edges and do not touch the bottom of the board, or flex the board in any way.
Avoid touching the motherboard components, IC chips, connectors, memory modules, and leads.
Place the motherboard on a grounded antistatic surface or on the antistatic bag that the board was shipped in.
Inspect the board for damage.

The following pages include details on how to install your motherboard into your chassis, as well as installing the processor, memory, disk drives and cables.

NOTE	**DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.**

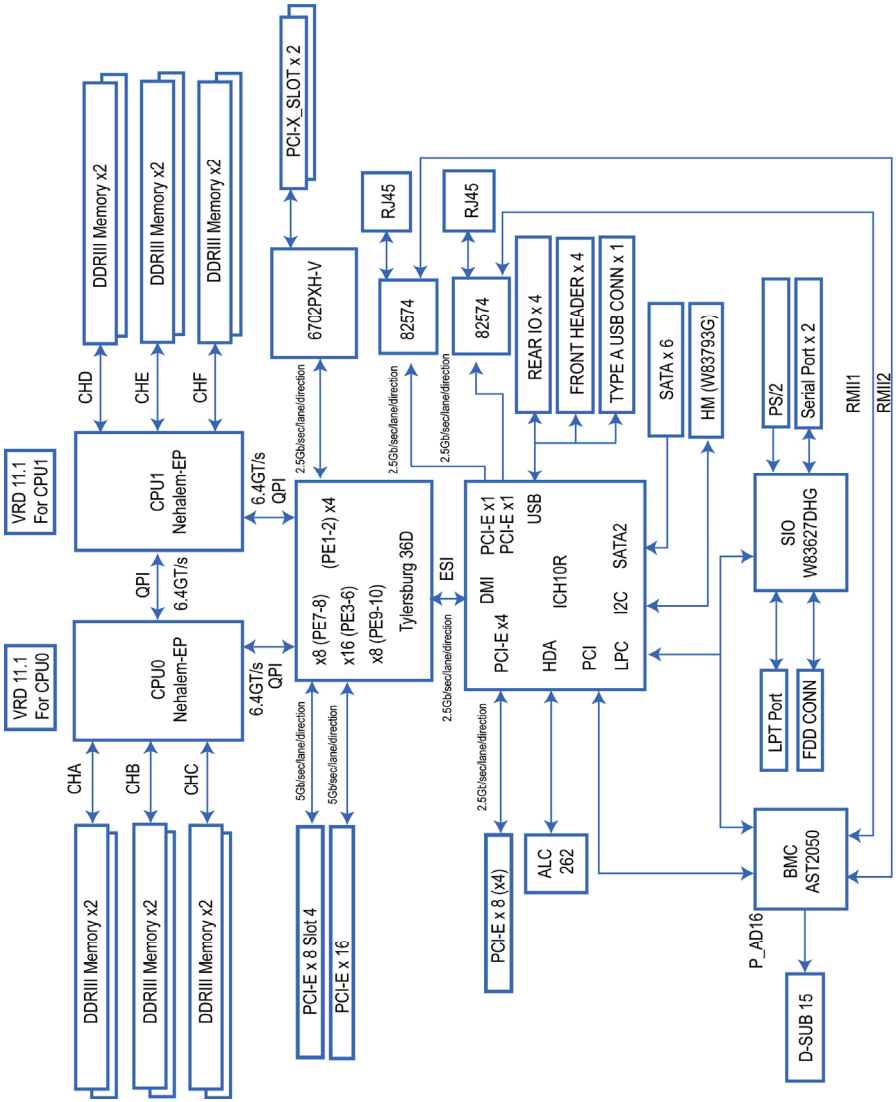
2.1 Board Image



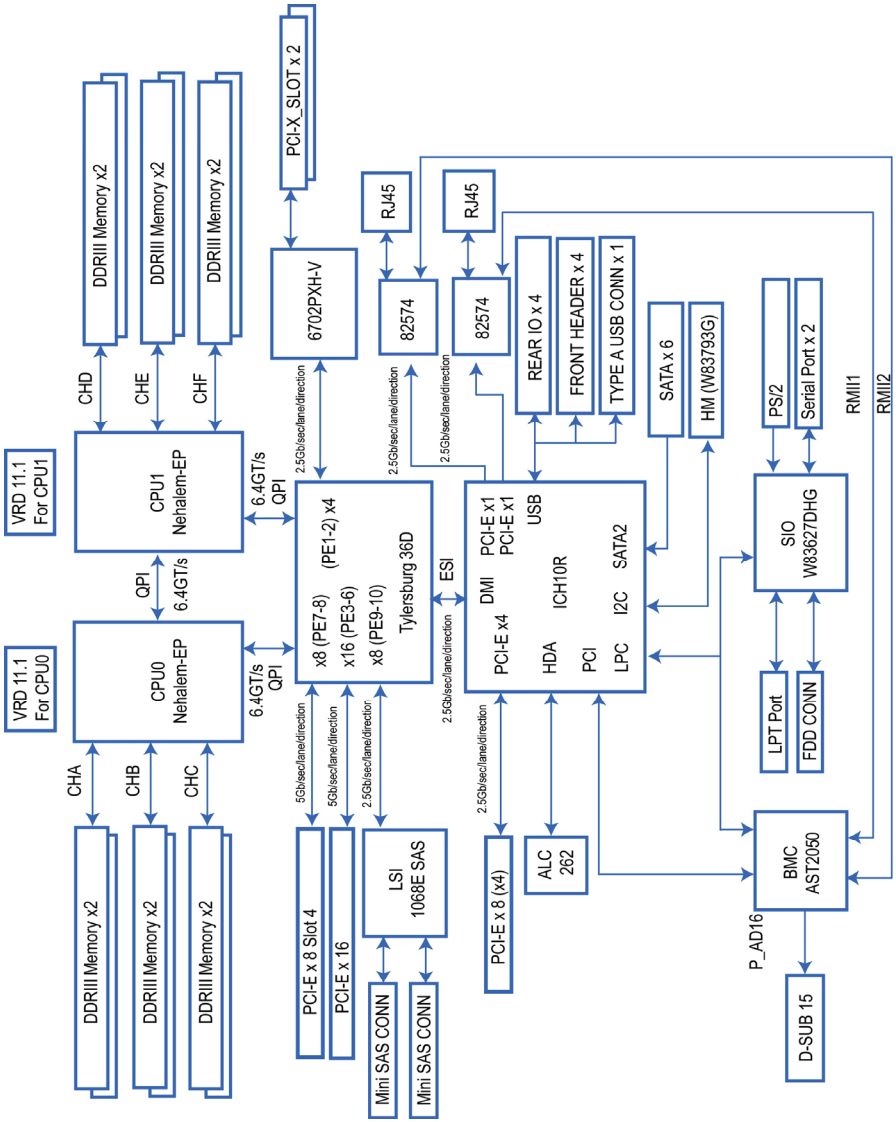
S7020

This picture is representative of the latest board revision available at the time of publishing. The board you receive may or may not look exactly like the above picture.

2.2 Block Diagram

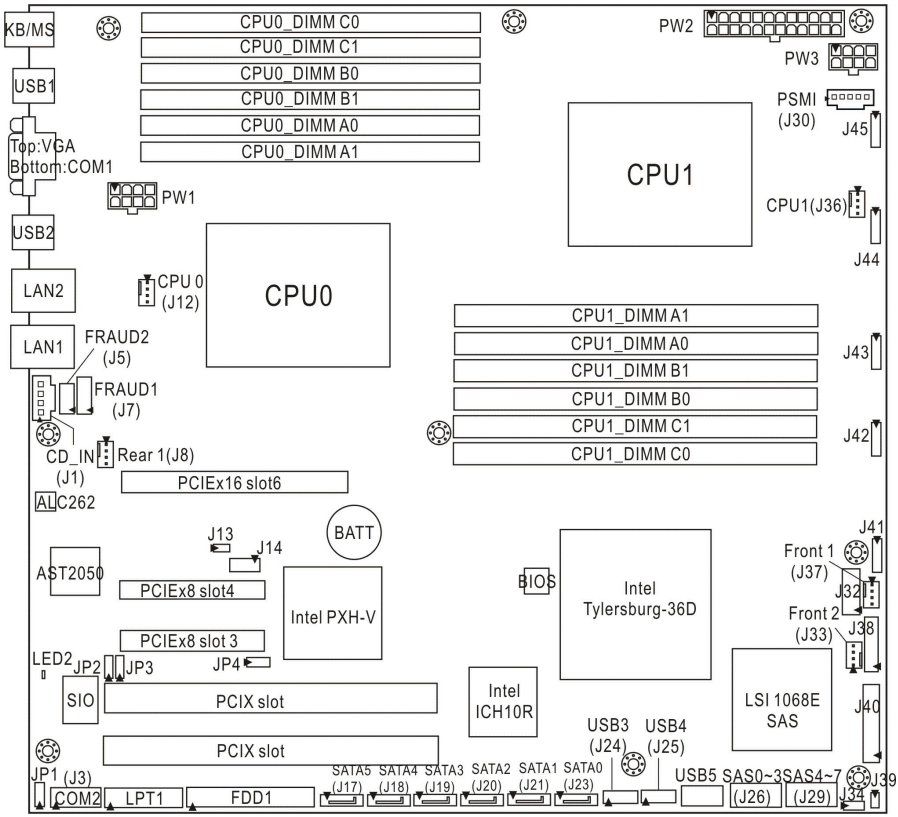


S7020AGM2NR



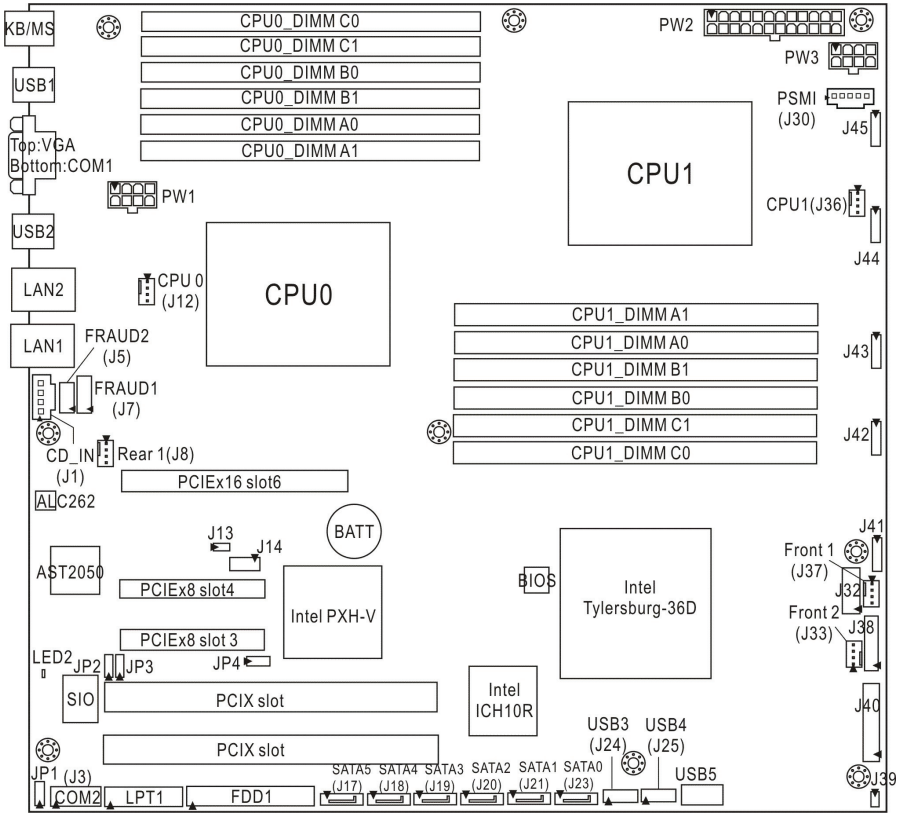
S7020WAGM2NR

2.3 Board Parts, Jumpers and Connectors



S7020WAGM2NR

This diagram is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above diagram.

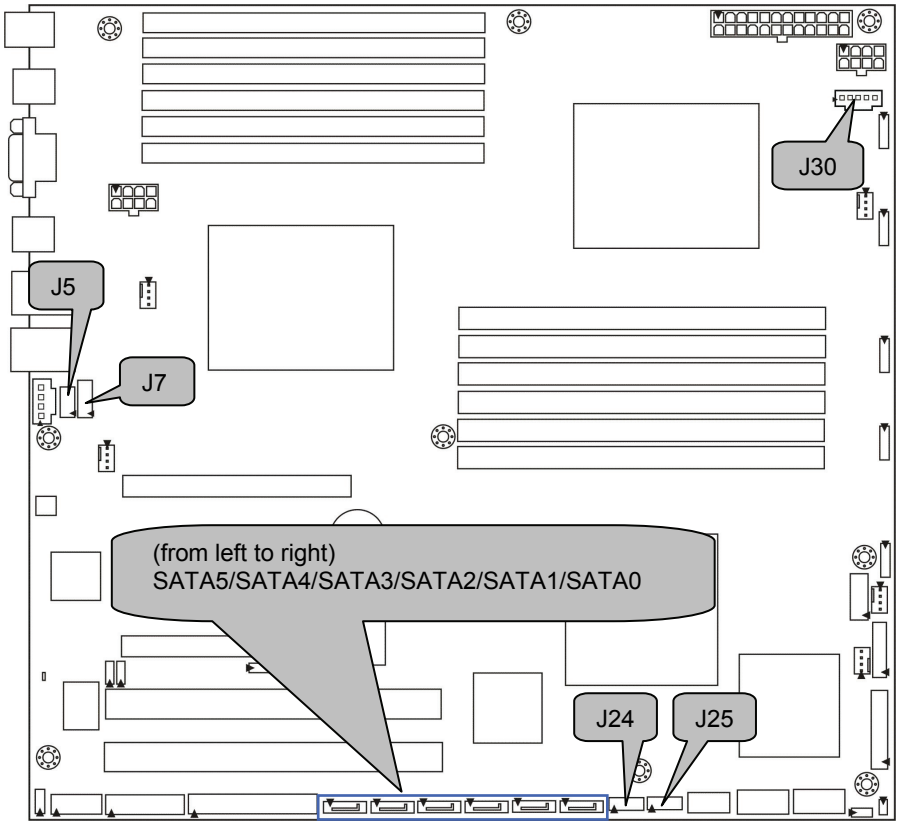


S7020AGM2NR

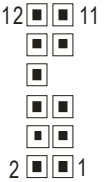
Jumper Legend

▣▣	**OPEN** - Jumper OFF, without jumper cover
▣▣	**CLOSED** – Jumper ON, with jumper cover

Jumper/Connector	Function
J40	Front Panel Connector
J24/J25	USB Front Panel Header (blue)
J3	COM2 Connector
J14	Port 80 Header
J39	Chassis Intrusion Header
J5	Intel HD Audio Header
J7	Specific Definition Audio Header
USB5	Type-A USB Connector
J1	CD_IN Connector
J30	PSMI Connector
J32	ICH SGPIO Header
J38	BB Fan Header (reserved for Barebone)
J41/J42/J43/J44/J45	8-pin 4056 Fan Connector
J8/J12/J33/J36/J37	4-pin Fan Connector
LED2	BMC LED
J13	BMC Reset Jumper NC: Default Pin 1-2 closed: Disable BMC
JP1	Clear CMOS Jumper Pin 1-2 closed: Normal (Default) Pin 2-3 closed: Clear
JP2/JP3	COM2 Switch Jumper Pin 1-2 closed: SIO to COM2 (Default) Pin 2-3 closed: BMC UART2 to COM2
J34	SAS Enable/Disable Jumper Pin 1-2 closed: Enable (Default) Pin 2-3 closed: Disable
JP4	PCIX Frequency Select Jumper Pin 1-2 closed: 133MHz (Default) Pin 2-3 closed: 100MHz


J30
J5
J7
(from left to right)
SATA5/SATA4/SATA3/SATA2/SATA1/SATA0
J24
J25

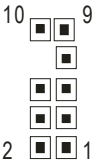
FPAUD1 (J7): Specific Definition Audio Header



TYAN does not provide cables for this header.

Pin	Signal	Pin	Signal
1	MIC_L_IN	2	MIC_R_IN
3	GND	4	MIC_JD
5	LINE_IN_L	6	LINE_IN_R
7	KEY	8	LINE_IN_JD
9	LINE_OUT_L	10	LINE_OUT_R
11	NC	12	LINE_OUT_JD

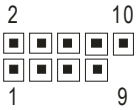
FPAUD2 (J5): Intel HD Audio Header



TYAN does not provide cables for this header.

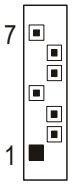
Pin	Signal	Pin	Signal
1	MIC_L_IN	2	GND
3	MIC_R_IN	4	NC
5	LINE_R_IN	6	MIC_JD
7	I/O SENSE	8	KEY
9	LINE_L_IN	10	LINE_JD

J24/J25: USB Front Panel Header (Blue)



Pin	Signal	Pin	Signal
1	+5V	2	+5V
3	USB D-	4	USB D-
5	USB D+	6	USB D+
7	GND	8	GND
9	KEY	10	GND

SATA0/1/2/3/4/5: Serial ATA Connector

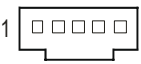


7	GND
6	RXP
5	RXN
4	GND
3	TXN
2	TXP
1	GND

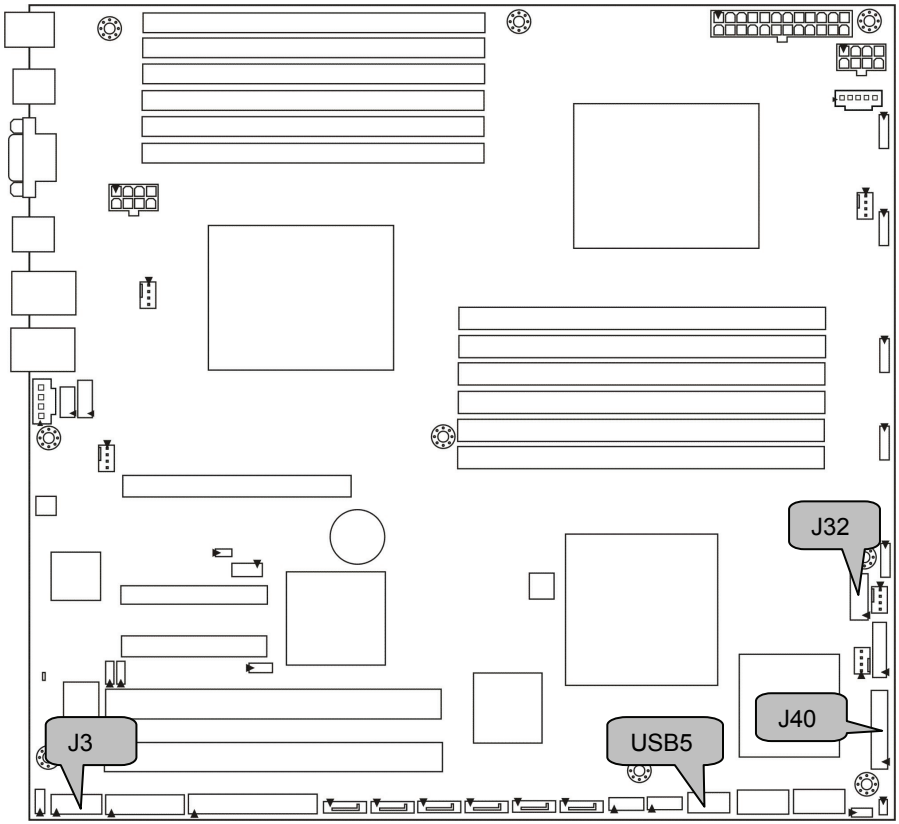
Connects to the Serial ATA ready drives via the Serial ATA cable.

SATA0: J23	SATA1: J21
SATA2: J20	SATA3: J19
SATA4: J18	SATA5: J17

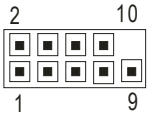
J30: PSMI Connector



Pin	Signal	Pin	Signal
1	SMB_CLK	2	SMB_DAT
3	SMBALERT	4	GND
5	V3P3		

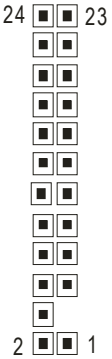

J32
J3
USB5
J40

J3: COM2 Connector



Pin	Signal	Pin	Signal
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	KEY

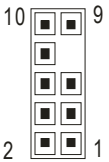
J40: Standard Front Panel Connector



Pin	Signal	Pin	Signal
1	PWRLED+	2	+3VSB
3	KEY	4	IDLED+
5	PWRLED-	6	IDLED-
7	HDLED+	8	WLED-
9	HDLED-	10	WLED+
11	PWRSW+	12	LAN1LED+
13	GND	14	LAN1LED-
15	RSTSW	16	SMBDAT
17	GND	18	SMBCLK
19	IDLED_SW	20	INTRD#
21	GND	22	LAN2LED+
23	NMI_SW-	24	LAN2LED-

NOTE1: +3.3V power rail is IDLED, WLED (Warning LED), LANLED
NOTE2: +5V power rail is PWRLED, HDLED

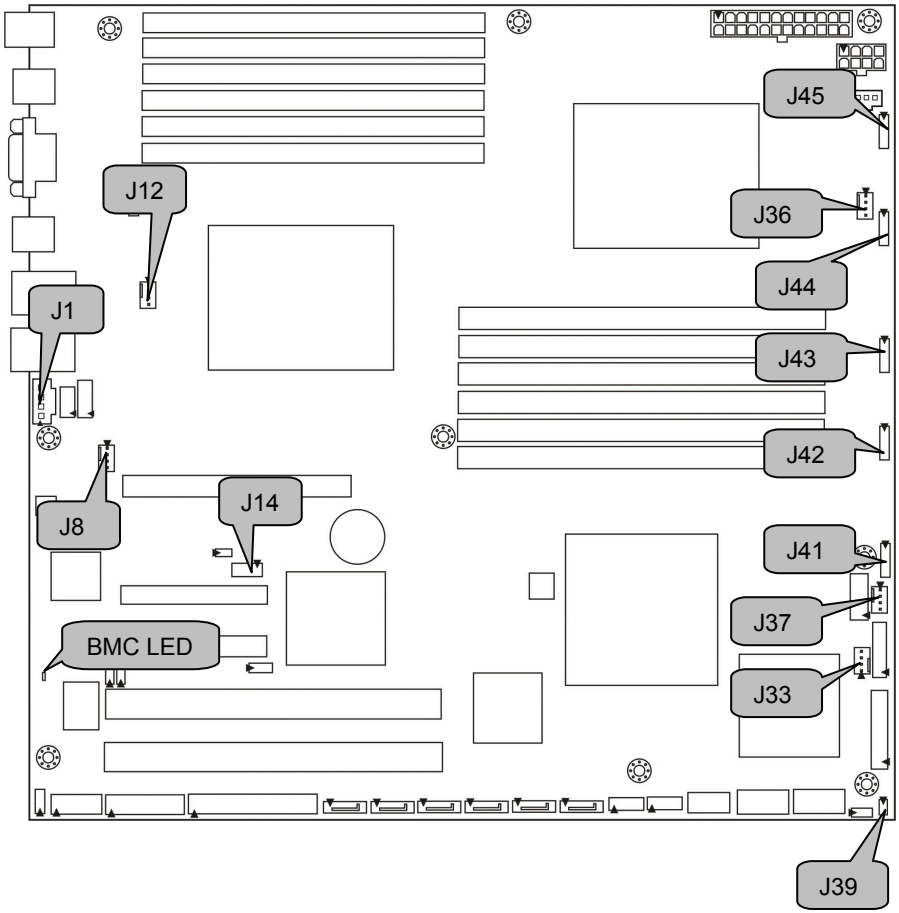
J32: ICH SGPIO Header



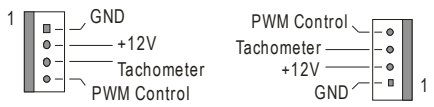
Pin	Signal	Pin	Signal
1	SMBCLK	2	SDATAOUT0
3	SMBDAT	4	SDATAOUT1
5	GND	6	SLOAD
7	KEY	8	SCLOCK
9	NC	10	NC

USB5: Type-A USB Connector

Pin	Signal	Pin	Signal
1	+5v	2	USB D-
3	USB D+	4	GND

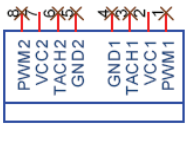

J45
J12
J36
J44
J1
J43
J42
J14
J8
J41
J37
BMC LED
J33
J39

J8/J12/J33/J36/J37: 4-pin Fan Header



Use this header to connect the cooling fan to your motherboard to keep the system at optimum performance levels.

J41/J42/J43/J44/J45: 8-pin 4056 Fan Header



Pin	Signal	Pin	Signal
1	PWM1	2	+12V
3	TACH1	4	GND
5	GND	6	TACH2
7	+12V	8	PWM2

NOTE: Do not mix 8-pin Fan headers with 4-pin Fan headers. Mix use of these fan headers will cause problems to the system.

J1: CD_IN Audio Header

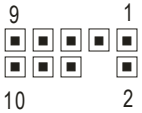
TYAN does not provide cables for this header.

Pin	Signal	Pin	Signal
1	CD_IN_L	2	GND
3	GND	4	CD_IN_R

J39: Chassis Intrusion Header

Pin	Signal	Pin	Signal
1	INTRUDER#	2	GND

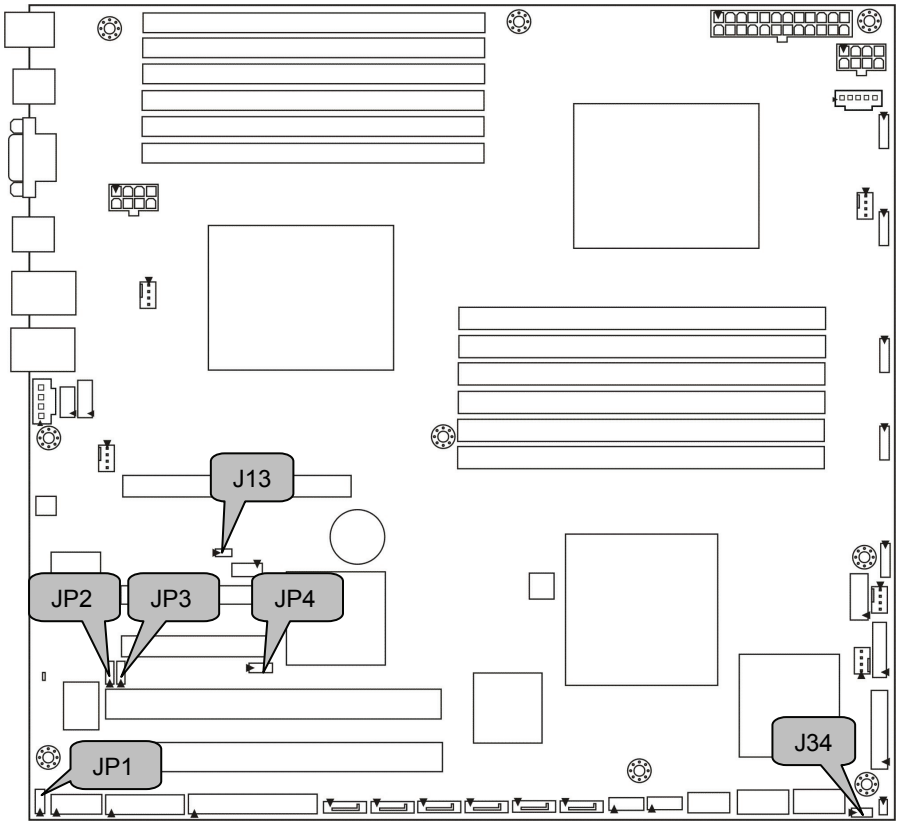
J14: PORT 80 Header



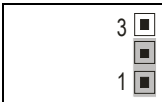
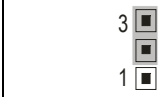
Pin	Signal	Pin	Signal
1	+3.3V	2	FRAME
3	LAD0	4	KEY
5	LAD1	6	PLTRST
7	LAD2	8	GND
9	LAD3	10	CLK 33M

LED2: BMC LED

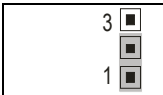
The ASPEED heatbeat LED indicates the ASPEED status.
Always on: BMC is going to boot up or not working
Blinking: BMC ready
OFF: S5 power down


J13
JP2
JP3
JP4
JP1
J34

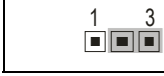
JP1: Clear CMOS Jumper

 **Normal (Default)**	Use this jumper when you forgot your system/setup password or need to clear system BIOS setting. How to clear the CMOS data - Power off system and **disconnect power supply from AC source** - Use jumper cap to close Pin_2 and 3 for several seconds to Clear CMOS - Replace jumper cap to close Pin_1 and 2 Reconnect power supply to AC source Power on system
 **Clear**	

JP2/JP3: COM2 Switch Jumper

	Pin 1-2 Closed: SIO to COM2 (**Default**)
	Pin 2-3 Closed: BMC UART2 to COM2

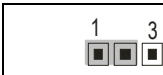
JP4: PCIX Frequency Select Jumper

	Pin 1-2 Closed: PCIX 133MHz (**Default**)
	Pin 2-3 Closed: PCIX 100MHz

J13: BMC Reset Jumper

	NC: (**Default**)
	Pin 1-2 Closed: Disable BMC

J34: SAS Enable/Disable Jumper (for S7020WAGM2NR only)

	Pin 1-2 Closed: Enable (**Default**)
	Pin 2-3 Closed: Disable

2.4 Installing the Processor and Heat Sink

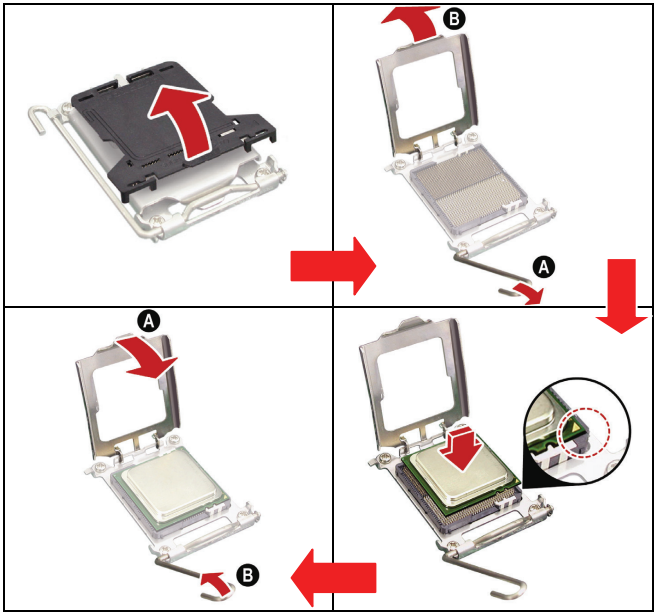
Your S7020 supports the latest processor technologies from Intel®. Check the TYAN website for latest processor support:

http://www.tyan.com

Processor Installation (LGA1366 Socket)
The processor should be installed carefully. Make sure you are wearing an antistatic strap and handle the processor as little as possible. Please note that both processors of the **same type and frequency** are required for optimal system performance.

NOTE: TYAN is not liable for damage as a result of operating an unsupported configuration.

Follow these instructions to install your processor.



The diagram is provided as a visual guide to help you install the socket processor and may not be an exact representation of the processor you have.

Step 1: Take off the CPU protection cap.

Step 2: Pull the CPU lever up to unlock the CPU socket (A). Then open the socket in the direction as shown (B).

Step 3: Place the CPU on the CPU socket, ensuring that pin 1 is located in the right direction.

Step 4: Close the CPU socket cover (A) and press the CPU socket lever down to secure the CPU (B).

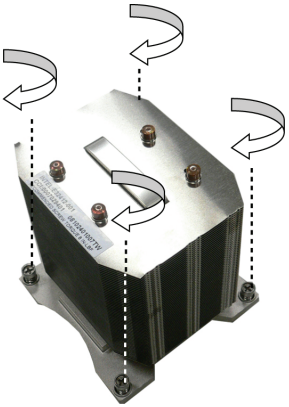
	Take care when installing the processor as it has very fragile connector pins below the processor that can bend and break if inserted improperly.

Heat Sink Installation

After installing the processor, you should proceed to install the heat sink. The CPU heat sink will ensure that the processor do not overheat and continue to operate at maximum performance for as long as you own them. The overheated processor is dangerous to the motherboard.

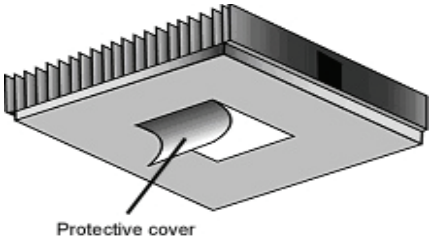
For the safest method of installation and information on choosing the appropriate heat sink, using heat sinks validated by Intel®.
Please refer to Intel's website at **www.Intel.com**

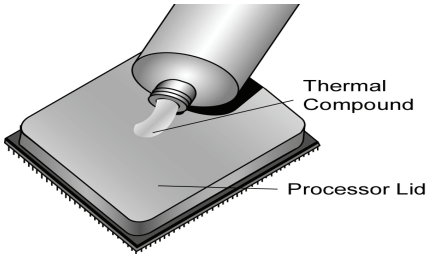
The following diagram illustrates how to install heat sink onto the CPU of S7020.



Place the heat sink on top of the CPU and secure it to the motherboard using four screws clockwise.

2.5 Thermal Interface Material





There are two types of thermal interface materials designed for use with the processors.

The most common material comes as a small pad attached to the heat sink at the time of purchase. There should be a protective cover over the material. Take care not to touch this material. Simply remove the protective cover and place the heat sink on the processor.

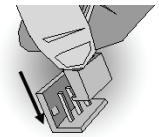
The second type of interface material is usually packaged separately. It is commonly referred to as 'thermal compound'. Simply apply a thin layer on to the CPU lid (applying too much will actually reduce the cooling).

Note:

Always check with the manufacturer of the heat sink & processor to ensure the Thermal Interface material is compatible with the processor & meets the manufacturer's warranty requirements.

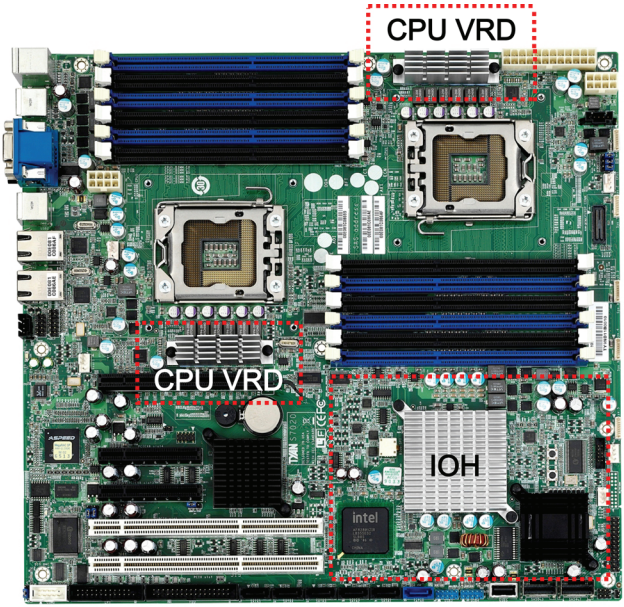
2.6 Finishing Installing the Heat Sink

After you have finished installing the heat sink onto the processor and socket, attach the end wire of the fan (which should already be attached to the heat sink) to the motherboard. The following diagram illustrates how to connect fans onto the motherboard.



Once you have finished installing all the fans you can connect your drives (hard drives, CD-ROM drives, etc.) to your motherboard.

CPU VRD/IOH Heat Dispersion Notice



INSTALL FAN INTO CHASSIS TO LET AIR FLOW IN!!!
- To ensure that the board runs efficiently and does not overheat, make sure there is air flow around the CPU VRD/IOH (as shown) to help disperse the heat generated around the area.

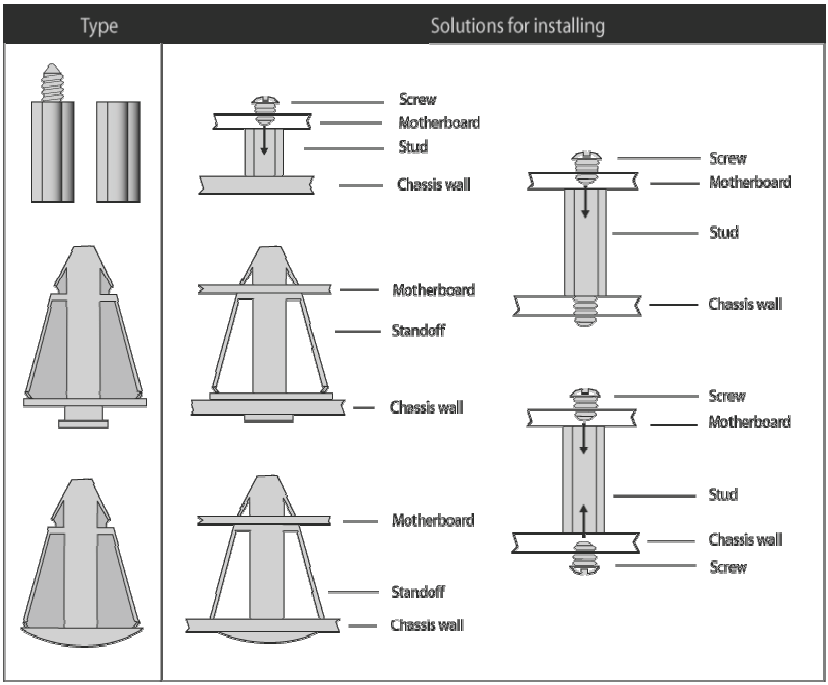
2.7 Tips on Installing Motherboard in Chassis

Before installing your motherboard, make sure your chassis has the necessary motherboard support studs installed. These studs are usually metal and are gold in color. Usually, the chassis manufacturer will pre-install the support studs. If you are unsure of stud placement, simply lay the motherboard inside the chassis and align the screw holes of the motherboard to the studs inside the case. If there are any studs missing, you will know right away since the motherboard will not be able to be securely installed.

Some chassis' include plastic studs instead of metal. Although the plastic studs are usable, TYAN recommends using metal studs with screws that will fasten the motherboard more securely in place.

Below is a chart detailing what the most common motherboard studs look like and how they should be installed.

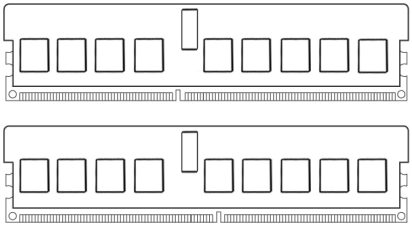
Mounting the Motherboard



2.8 Installing the Memory

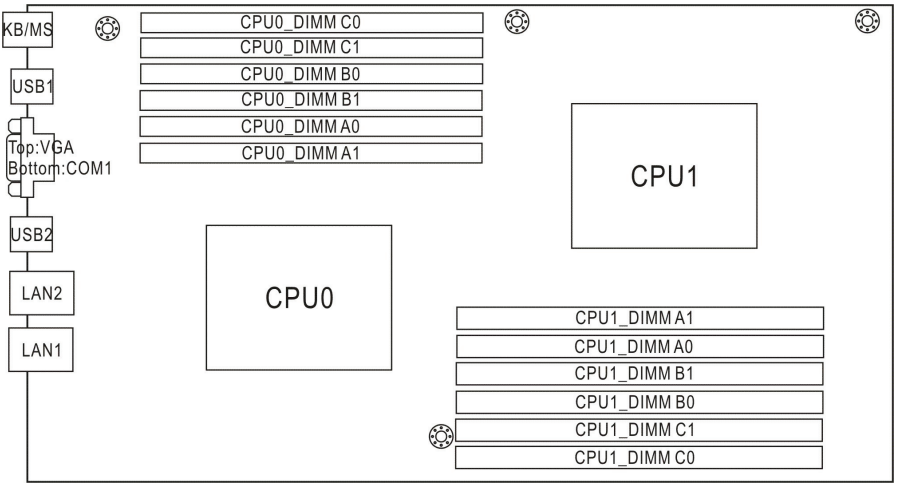
Before installing memory, ensure that the memory you have is compatible with the motherboard and processor. Check the TYAN Web site at: **www.tyan.com** for details of the type of memory recommended for your motherboard.

The following diagram shows common types of DDR3 memory modules.



Key points to note before installing memory:

- Automatic memory bus frequency setting based on memory configuration and memory SPD information (to be adjusted by BIOS)
- Supports up to 96GB (8GB x 12 DIMMs)
- Supports un-buffered ECC/Non-ECC modules
- Supports ECC Registered DDR3-800/1066/1333 memory modules
- Supports SR, DR, QR Rank Module
- All memory must be of the **same type and density**
- Always populate from DIMM0 first



The following tables outline the suggested rules for populating memory.

Table 1 RDIMM population

S7020 RDIMM population		One DIMMs per Channel			Two DIMMs per Channel				
Single Rank Memory	DIMM C0	x	x	x	x(*)	x(*)	x(*)	x(*)	x(*)
	DIMM C1				x(*)	x(*)	x(*)	x(*)	x(*)
	DIMM B0		x	x		x(*)	x(*)	x(*)	x(*)
	DIMM B1						x(*)	x(*)	x(*)
	DIMM A0			x				x(*)	x(*)
	DIMM A1								x(*)
Dual Rank Memory	DIMM C0	x	x	x	x(*)	x(*)	x(*)	x(*)	x(*)
	DIMM C1				x(*)	x(*)	x(*)	x(*)	x(*)
	DIMM B0		x	x		x(*)	x(*)	x(*)	x(*)
	DIMM B1						x(*)	x(*)	x(*)
	DIMM A0			x				x(*)	x(*)
	DIMM A1								x(*)
Quad Rank Memory	DIMM C0	x(*)	x(*)	x(*)	x(**)	x(**)	x(**)	x(**)	x(**)
	DIMM C1				x(**)	x(**)	x(**)	x(**)	x(**)
	DIMM B0		x(*)	x(*)		x(**)	x(**)	x(**)	x(**)
	DIMM B1						x(**)	x(**)	x(**)
	DIMM A0			x(*)				x(**)	x(**)
	DIMM A1								x(**)

x(*)	1066MHz	
x(**)	800MHz	

Max Memory combination
Single Rank Registered DIMMs: 48GB(12x4GB DIMMs)
Dual Rank Registered DIMMs: 96GB(12x8GB DIMMs)
Quad Rank Registered DIMMs: 96GB(12x8GB DIMMs)

Table 2 UDIMM population

S7020 UDIMM population		One DIMMs per Channel			Two DIMMs per Channel				
Single Rank Memory	DIMM C0	x	x	x	x	x	x	x	x
	DIMM C1				x	x	x	x	x
	DIMM B0		x	x		x	x	x	x
	DIMM B1						x	x	x
	DIMM A0			x				x	x
	DIMM A1								x
Dual Rank Memory	DIMM C0	x	x	x	x(*)	x(*)	x(*)	x(*)	
	DIMM C1				x(*)	x(*)	x(*)	x(*)	
	DIMM B0		x	x		x(*)	x(*)	x(*)	
	DIMM B1						x(*)	x(*)	
	DIMM A0			x				x(*)	
	DIMM A1								

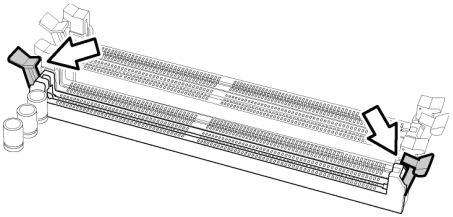
x(*)	1066MHz	

Max Memory combination
Single Rank Unbuffered DIMMs
24GB(12x2GB DIMMs)
Dual Rank Unbuffered DIMMs
48GB(12x4GB DIMMs)

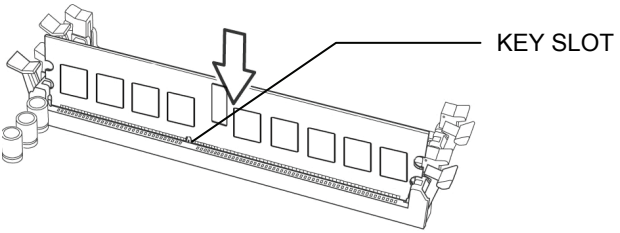
Memory Installation Procedure

Follow these instructions to install memory modules into the S7020.

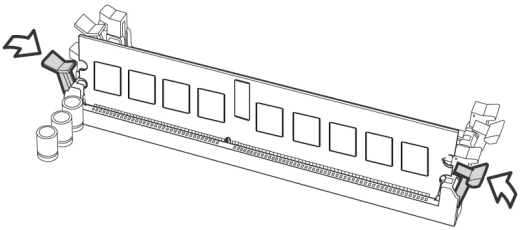
1. Press the locking levers in the direction shown in the following illustration.



Align the memory module with the socket. The memory module is keyed to fit only one way in the socket.



Seat the module firmly into the socket by gently pressing down until it sits flush with the socket. The locking levers pop up into place.



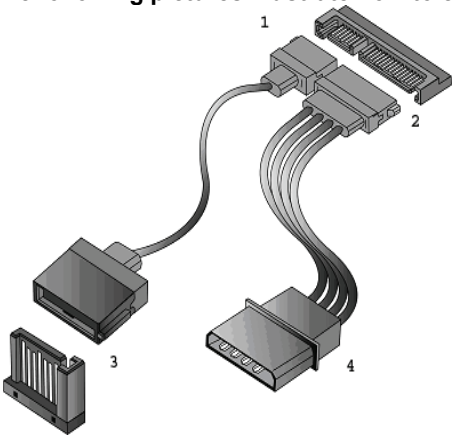
2.9 Attaching Drive Cables

Attaching Serial ATA Cables
The S7020 is equipped with **6** Serial ATA (SATA) channels. Connections for these drives are very simple.

There is no need to set Master/Slave jumpers on SATA drives.

TYAN has supplied two SATA cables and one SATA power adapter. If you are in need of other cables or power adapters please contact your place of purchase.

The following pictures illustrate how to connect an SATA drive



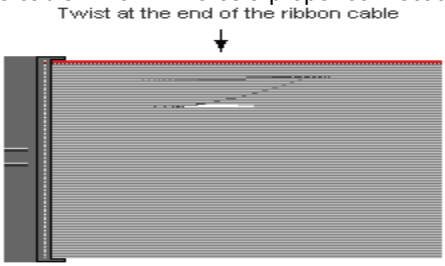
SATA drive cable connection

2. SATA drive power connection

3. SATA cable motherboard connector

4. SATA drive power adapter

Attaching Floppy Drive Cables
Attaching floppy diskette drives are done in a similar manner to hard drives. See the picture below for an example of a floppy cable. Most of the current floppy drives on the market require that the cable be installed with the colored stripe positioned next to the power connector. In most cases, there will be a key pin on the cable which will force a proper connection of the cable.



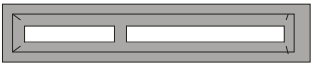
Attach first floppy drive (drive **A:**) to the end of the cable with the twist in it. Drive **B:** is usually connected to the next possible connector on the cable (the second or third connector after you install Drive **A:**).

2.10 Installing Add-In Cards

Before installing add-in cards, it's helpful to know if they are fully compatible with your motherboard. For this reason, we've provided the diagrams below, showing the slots that appear on your motherboard.

1 PCI-E x16 slot

2 PCI-E x8 slots



2 PCI-X 64/133MHz slots

Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards into any slots if they do not seat in place. It is better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

NOTE	**YOU MUST ALWAYS** unplug the power connector from the motherboard before performing system hardware changes. Otherwise you may damage the board and/or expansion device.

2.11 Installing I/O Shield

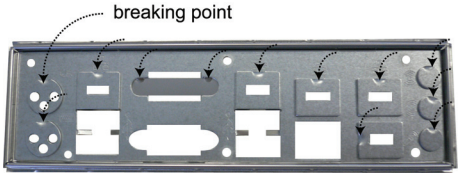
Before you connect external devices, look into your motherboard package and take out the I/O shield. Follow the following instructions to install the I/O shield to your rear panel.

1. **Preparation**
   - ✓ flat-head screw driver x 1
   - ✓ long nose pliers x 1
   - ✓ protective gloves x 1
   - ✓ I/O shield x 1

2. **Caution**

Warning: To reduce the risk of personal injury, always wear gloves when handling the I/O shield.

Note that each I/O port has its breaking point which may be not in the same direction. Use the pliers, not your fingers, to grasp and turn the cap towards the breaking point to twist it off the shield.

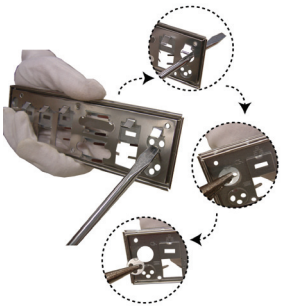


3. **Installation**

Step 1.
Use the screw driver to push open the I/O port cap.

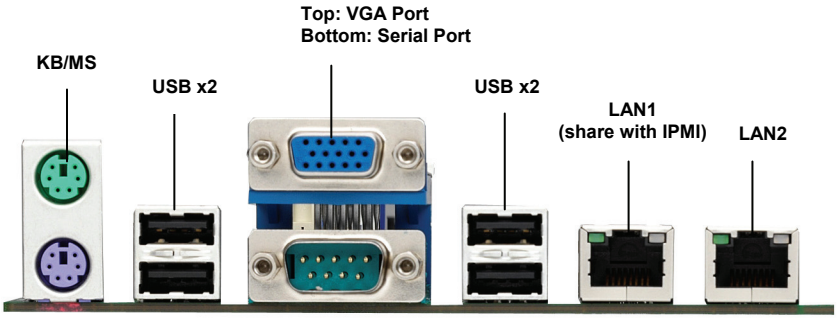
Step 2.
Use the pliers to grasp and twist the I/O port cap off the shield.

Step 3.
Repeat *Step 1 & 2* to remove the I/O caps in accordance with your rear I/O configuration and then attach the I/O shield to the rear panel.



2.12 Connecting External Devices

The following diagram will detail the rear port stack for this S7020 motherboard:



NOTE: Peripheral devices can be plugged straight into any of these ports but software may be required to complete the installation.

Onboard LAN LED Color Definition

The three onboard Ethernet ports have green and yellow LEDs to indicate LAN status. The chart below illustrates the different LED states.

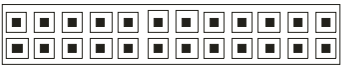
10/100/1000 Mbps LAN Link/Activity LED Scheme			
LEFT RIGHT		Left LED	Right LED
10 Mbps	Link	Slow Blinking Green	Off
	Active	Blinking Green	Off
100 Mbps	Link	Slow Blinking Green	Green
	Active	Blinking Green	Green
1000 Mbps	Link	Slow Blinking Green	Orange
	Active	Blinking Green	Orange
No Link		Off	Off

2.13 Installing the Power Supply

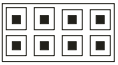
There are four power connectors on your S7020. The S7020 requires 3 power inputs.

- 24-pin (PW2)
- 8-pin (PW1, PW3)

1 x 24-pin 12V Power Connector (PW2)



2 x 8-pin 12V Power Connector (PW1, PW3)



NOTE: Please be aware that ATX 2.x, ATX12V and ATXGES power supplies may **not** be compatible with the board and can damage the motherboard and/or CPU(s).

Applying power to the board:
Connect the 12V 8-pin power connector.
Connect the EPS/12V 24-pin power connector.
Connect power cable to power supply and power outlet.

NOTE	**YOU MUST** unplug the power supply before plugging the power cables to motherboard connectors.

2.14 Finishing up

Congratulations on making it this far! You're finished setting up the hardware aspect of your computer. Before closing up your chassis, make sure that all cables and wires are connected properly, especially IDE cables and most importantly, jumpers. You may have difficulty powering on your system if the motherboard jumpers are not set correctly.

In the rare circumstance that you have experienced difficulty, you can find help by asking your vendor for assistance. If they are not available for assistance, please find setup information and documentation online at our website or by **calling your vendor's support line.**

NOTE

Chapter 3: BIOS Setup

About the BIOS

The BIOS is the basic input/output system, the firmware on the motherboard that enables your hardware to interface with your software. The BIOS determines what a computer can do without accessing programs from a disk. The BIOS contains all the code required to control the keyboard, display screen, disk drives, serial communications, and a number of miscellaneous functions. This chapter describes the various BIOS settings that can be used to configure your system.

The BIOS section of this manual is subject to change without notice and is provided for reference purposes only. The settings and configurations of the BIOS are current at the time of print and are subject to change, and therefore may not match exactly what is displayed on screen.

This section describes the BIOS setup program. The setup program lets you modify basic configuration settings. The settings are then stored in a dedicated, battery-backed memory (called NVRAM) that retains the information even when the power is turned off.

To start the BIOS setup utility:
1. Turn on or reboot your system.
2. Press <Del> during POST (<Tab> on remote console) to start the BIOS setup utility.

BIOS Menu Bar

The menu bar at the top of the windows lists these selections:

Main	To configure basic system setups
Advanced	To configure the advanced chipset features
PCI/PnP	To configure legacy Plug & Play or PCI settings
Boot	To configure system boot order
Security	To configure user and supervisor passwords
Chipset	To configure chipset management features
Exit	To exit setup utility

Setup Basics

The table below shows how to navigate in the setup program using the keyboard.

Key	Function
<F1>	General help window
<ESC>	Exit current menu
← → arrow keys	Select a different menu
↑ or ↓ arrow keys	Move cursor up/down
<Tab> or <Shift-Tab>	Cycle cursor up/down
<Home> or <End>	Move cursor to top/bottom of the window
<PgUp> or <PgDn>	Move cursor to next/previous page
<->	Select the previous value/setting of the field
<+>	Select the next value/setting of the field
<F8>	Load Fail Safe default configuration values of the menu
<F9>	Load the Optimal default configuration values of the menu
<F10>	Save and exit
<Enter>	Execute command or select submenu

Getting Help

Press [**F1**] to display a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press [**ESC**].

In Case of Problems

If you have trouble booting your computer after making and saving the changes with the BIOS setup program, you can restart the computer by holding the power button down until the computer shuts off (usually within 4 seconds); resetting by pressing CTRL-ALT-DEL; or clearing the CMOS.
The best advice is to only alter settings that you thoroughly understand. In particular, do not change settings in the Chipset section unless you are absolutely sure of what you are doing. The Chipset defaults have been carefully chosen either by TYAN or your system manufacturer for best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

NOTE**:** The following pages provide the details of BIOS menu. Please be noticed that the BIOS menu are continually changing due to the BIOS updating. The BIOS menu provided are the most updated when this manual is written. Please visit TYAN's website at http://www.tyan.com for the information of BIOS updating.

3.1 BIOS Main Menu

The Main BIOS Menu is the first screen that you can navigate. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured, options in blue can be changed.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often, a text message will accompany it.

BIOS Setup Utility

Main Advanced PCI/PnP Boot Security Chipset Exit

System Overview

AMIBIOS
Version : Vx.xx
Build Date : DD/MM/YY
ID : xxxx_xxx

Processor
Genuine Intel® CPU @ xxxx @ x.xxGHz
Speed : xxxx MHz
Count : x

System Memory
Size : xxxx MB

System Time [HH:MM:SS]
System Date [MM:DD:YYYY]

Use [ENTER], [TAB] or [SHIFT-TAB] to select a field

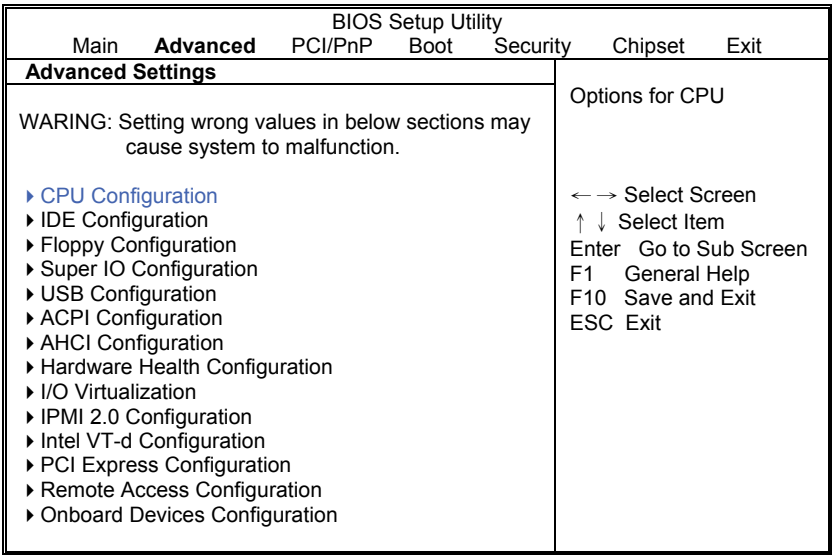
Use [+] or [-] to configure system time.

←→ Select Screen
↑ ↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Main		
System Time	HH : MM : SS	Set the system time
System Date	MM : DD : YYYY	Set the system date

3.2 Advanced Menu

You can select any of the items in the left frame of the screen, such as Super I/O Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.



Feature	Option	Description
Advanced Settings		
CPU Configuration	Menu Item	Options for CPU
IDE Configuration	Menu Item	Configure the IDE device(s)
Floppy Configuration	Menu Item	Configure the Floppy drive
Super IO Configuration	Menu Item	Configures Super IO Chipset Win627DHG
USB Configuration	Menu Item	Configure the USB support
ACPI Configuration	Menu Item	Section for Advanced ACPI Configuration
AHCI Configuration	Menu Item	Section for Advanced AHCI Configuration
Hardware Health Configuration	Menu Item	Configure/monitor the Hardware Health

Feature	Option	Description
Advanced Settings		
I/O Virtualization	Menu Item	Configure I/O virtualization parameters
IPMI 2.0 Configuration	Menu Item	IPMI configuration including server monitoring and event log
Intel VT-d Configuration	Menu Item	Configure Intel® Virtualization Technology for Directed I/O (VT-d) support
PCI Express Configuration	Menu Item	Configure PCI Express Support
Remote Access Configuration	Menu Item	Configure Remote Access
Onboard Devices Configuration	Menu Item	Onboard Devices and PCI Add-on cards Enable/Disable

3.2.1 CPU Configuration

You can use this screen to view CPU Configuration Menu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

BIOS Setup Utility

Main **Advanced** PCI/PnP Boot Security Chipset Exit

Configure advanced CPU settings
Module Version: xx.xx

Manufacturer: Intel
Intel® CPU: @ xxxx @ x.xxGHz
Frequency: xxxGHz
BCLK Speed: xxxxMHz
Cache L1: xxKB
Cache L2: xxxxKB
Cache L3: xxxxKB
Ratio Status: Unlocked (Min:12, Max:18)
Ratio Actual Value: 18

C1E Support	[Enabled]
Hardware Prefetcher	[Enabled]
Adjacent Cache Line Prefetch	[Enabled]
Max CPUID Value Limit	[Disabled]
Intel® Virtualization Tech	[Enabled]
Execute-Disable Bit Capability	[Enabled]
Intel® HT Technology	[Enabled]
Active Processor Cores	[All]
A20M	[Disabled]
Intel® SpeedStep™ Tech	[Enabled]
Intel® TurboMode Tech	[Enabled]
Intel® C-STATE Tech	[Enabled]
C3 State	[ACPI C2]
C6 State	[Enabled]
C State package limit setting	[Auto]
C1 Auto Demotion	[Enabled]
C3 Auto Demotion	[Enabled]
ACPI T State	[Enabled]

This should be enabled in order to enable or disable the "Enhanced Halt State".

←→ Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

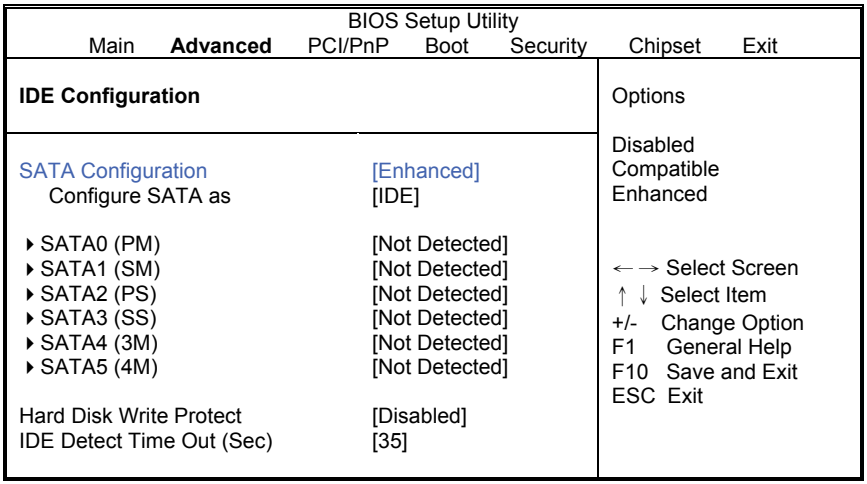
Feature	Option	Description
CPU Configuration		
Manufacturer	Read only	Displays information about CPU
Intel® CPU		
Frequency		
BCLK Speed		
Cache L1/L2/L3		
Ratio Status		
Ratio Actual Value		

C1E Support	**Enabled** Disabled	This should be enabled in order to enable or disable the "Enhanced Halt State".
Hardware Prefetcher	**Enabled** Disabled	For UP platforms, leave it enabled. For DP/MP servers, it may use to tune performance to the specific application.
Adjacent Cache Line Prefetch	**Enabled** Disabled	For UP platforms, leave it enabled. For DP/MP servers, it may use to tune performance to the specific application.
Max CPUID Value Limit	Enabled **Disabled**	Disabled for Windows XP
Intel® Virtualization Tech	**Enabled** Disabled	When enabled, a VMM can utilize the additional HW caps. Provided by Intel® Virtualization Tech. **Note:** A full reset is required to change the setting.
Execute-Disable Bit Capability	**Enabled** Disabled	When disabled, force the XD feature flag to always return 0.
Intel® HT Technology	**Enabled** Disabled	When disabled, only one thread per enabled core is enabled.
Active Processor Cores	**All**	Number of cores to enable in each processor package
A20M	**Disabled** Enabled	Legacy OSes and APs may need A20M enabled.
Intel® SpeedStep™ Tech	Disabled **Enabled**	Enable (GV3) Disable (GV3)
NOTE: *Intel® TurboMode Tech* will appear when *Intel® SpeedStep™ Tech* is set to [Enabled].		
Intel® TurboMode Tech	Disabled **Enabled**	Turbo mode allows processor cores to run faster than marked frequency in specific condition.
Intel® C-STATE Tech	Disabled **Enabled**	C-State: CPU idle is set to C2/C3/C4
NOTE: *C3 State and C6 State* will appear when *Intel® SpeedStep™ Tech* is set to [Disabled].		

C3 State	**ACPI C2**	Nehalem C State action select
	ACPI C3	
	Disabled	
C6 State	**Enabled**	Nehalem C State action select
	Disabled	
C State package limit setting	**Auto**	Selected option will program into C state package limit register.
	C1	
	C3	
	C6	
	C7	
C1 Auto Demotion	**Enabled**	When enabled, CPU will conditionally demote C3/C6/C7 requests to C1 based on uncore auto-demote information.
	Disabled	
C3 Auto Demotion	**Enabled**	When enabled, CPU will conditionally demote C6/C7 requests to C3 based on uncore auto-demote information.
	Disabled	
ACPI T State	**Enabled**	Report processor throttling in ACPI
	Disabled	

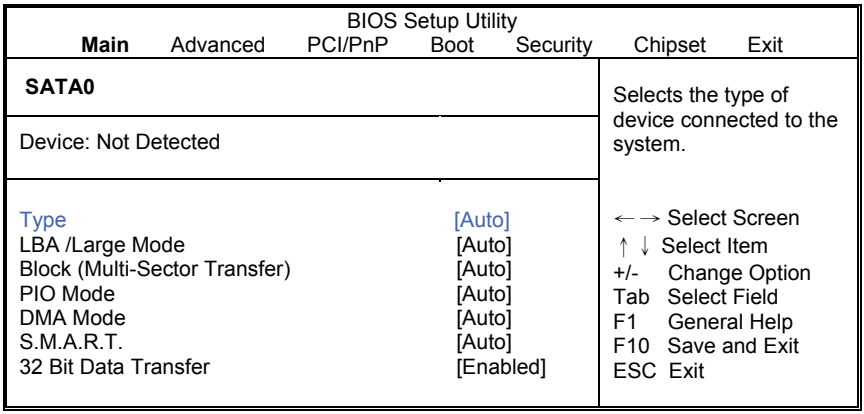
3.2.2 IDE Configuration Sub-Menu

You can use this screen to select options for the IDE Configuration Settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.



Feature	Option	Description
IDE Configuration		
SATA Configuration	**Enhanced** Compatible	Configure SATA devices
Configure SATA as	**IDE** RAID AHCI	Select legacy IDE, RAID or AHCI as the SATA interface.
Hard Disk Write Protect	**Disabled** Enabled	Enable/Disable device write protection. This will be effective only if device is accessed through BIOS.
IDE Detect Time Out (Sec)	0~**35** (at 5 interval)	Select the time out value for detecting ATA/ATAPI device(s).

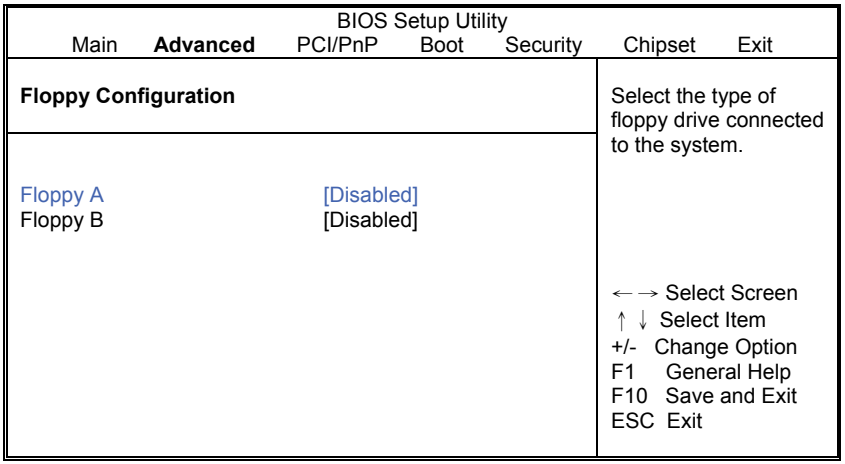
3.2.2.1 SATA0~SATA5 Sub-Menu



Feature	Option	Description
SATA0		
Type	**Auto** Not Installed CD/DVD ARMD	Selects the type of device connected to the system.
LBA/Large Mode	**Auto** Disabled	Auto: Enabled LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled. Disabled: Disabled LBA Mode.
Block (Multi-Sector Transfer)	**Auto** Disabled	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0~4 (at 1 interval)	Selects the PIO Mode. Select Auto to enhance hard disk performance by optimizing the hard disk timing.
DMA Mode	**Auto**	Selects DMA Mode. Auto: Auto detected.
S.M.A.R.T.	**Auto** Enabled	S.M.A.R.T (Self-Monitoring Analysis and Reporting Technology) is a utility that monitors your disk status to predict hard disk failure.
32Bit Data Transfer	**Enabled** Disabled	Enables 32-bit to maximize the IDE hard disk data transfer rate.

3.2.3 Floppy Configuration Sub-Menu

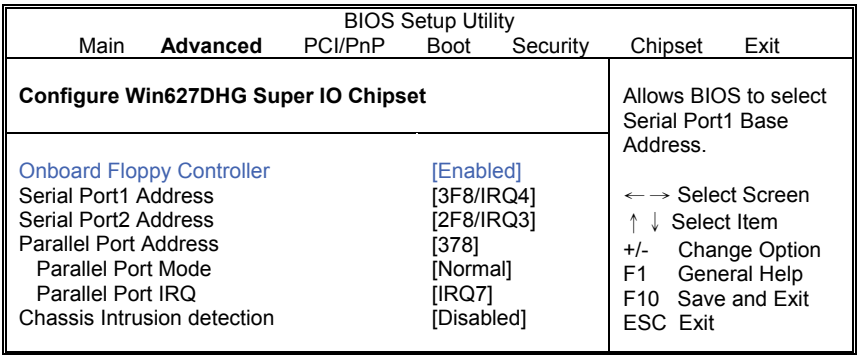
You can use this screen to specify options for the Floppy Configuration Settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Floppy Configuration
Select the type of floppy drive connected to the system.
Floppy A [Disabled]
Floppy B [Disabled]
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Floppy Configuration		
Floppy A Floppy B	**Disabled** 360 KB 51/4” 1.2 MB 51/4” 720 KB 31/2” 1.44 MB 31/2” 2.88 MB 31/2”	Selects the type of floppy drive connected to the system.

3.2.4 Super IO Configuration Sub-Menu

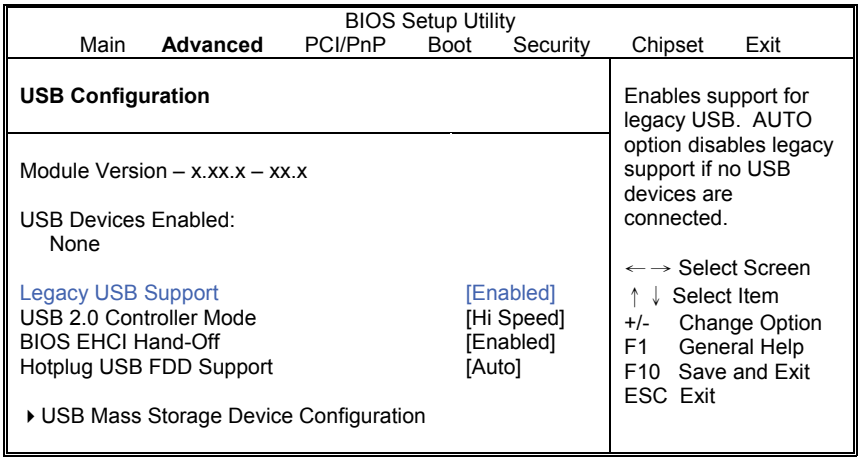
You can use this screen to select options for the Super I/O settings. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Configure Win627DHG Super IO Chipset
Allows BIOS to select Serial Port1 Base Address.
Onboard Floppy Controller [Enabled]
Serial Port1 Address [3F8/IRQ4]
Serial Port2 Address [2F8/IRQ3]
Parallel Port Address [378]
Parallel Port Mode [Normal]
Parallel Port IRQ [IRQ7]
Chassis Intrusion detection [Disabled]
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Configure Win627DHG Super IO Chipset		
Onboard Floppy Controller	**Enabled**	Allows BIOS to enable or disable the floppy controller
	Disabled	
Serial Port1 Address	**3F8 IRQ4**	Allow BIOS to select Serial Port1 Base Addresses
	3E8 IRQ4	
	2E8 IRQ3	
	2F8 IRQ3	
	Disabled	
Serial Port2 Address	3F8 IRQ4	Allow BIOS to select Serial Port2 Base Addresses
	3E8 IRQ4	
	2E8 IRQ3	
	2F8 IRQ3	
	Disabled	
Parallel Port Address	Disabled	Allow BIOS to select Parallel Port Base Addresses
	378	
	278	
	3BC	
Parallel Port Mode	**Normal**	Allow BIOS to select Parallel Port Mode
	Bi-directional	
	ECP	
	EPP	
	ECP & EPP	
Parallel Port IRQ	**IRQ7**	Allow BIOS to select Parallel Port IRQ
	IRQ5	
Chassis Intrusion detection	**Disabled**	When a chassis open event is detected, the BIOS will record the event and issue a warning beep.
	Enabled	

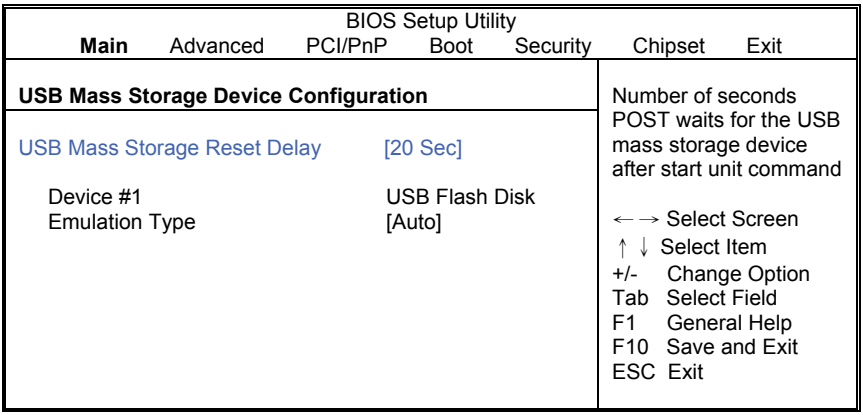
3.2.5 USB Configuration Sub-Menu

You can use this screen to view the USB Configuration Menu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
USB Configuration
Module Version – x.xx.x – xx.x
USB Devices Enabled:
None
Legacy USB Support [Enabled]
USB 2.0 Controller Mode [Hi Speed]
BIOS EHCI Hand-Off [Enabled]
Hotplug USB FDD Support [Auto]
USB Mass Storage Device Configuration
Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
USB Configuration		
Legacy USB Support	Disabled Auto **Enabled**	Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.
USB 2.0 Controller Mode	**Hi Speed** Full Speed	Configure the USB 2.0 controller in Hi Speed (480 Mbps) or Full Speed (12Mbps).
BIOS EHCI Hand-Off	**Enabled** Disabled	This is a work around for OSes without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
Hotplug USB FDD Support	Enabled Disabled **Auto**	Enable or disable hotplug USB floppy support. A dummy FDD device is created that will be associated with the hotplugged FDD later. AUTO option creates this dummy device only if there is no USB FDD present.

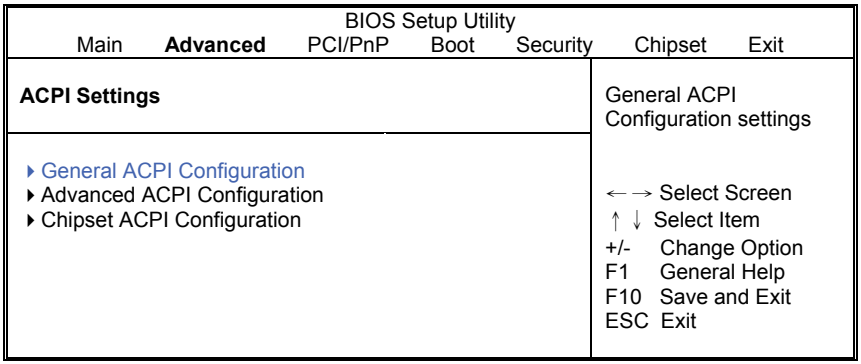
3.2.5.1 USB Mass Storage Device Configuration Sub-Menu


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
USB Mass Storage Device Configuration
USB Mass Storage Reset Delay [20 Sec]
Device #1 USB Flash Disk
Emulation Type [Auto]
Number of seconds POST waits for the USB mass storage device after start unit command
← → Select Screen
↑ ↓ Select Item
+/- Change Option
Tab Select Field
F1 General Help
F10 Save and Exit
ESC Exit

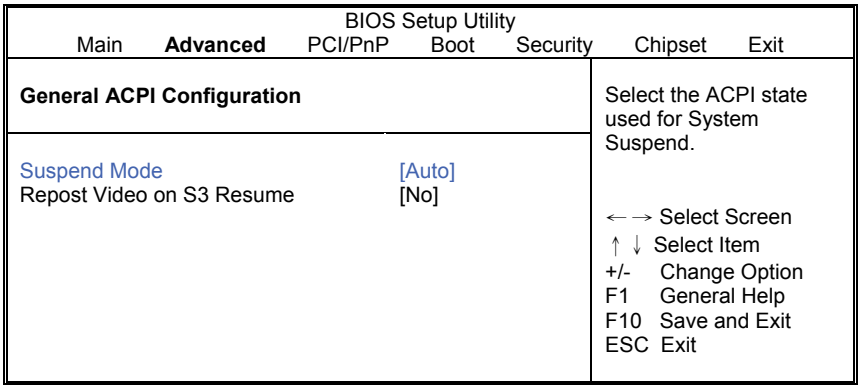
Feature	Option	Description
USB Mass Storage Device Configuration		
USB Mass Storage Reset Delay	10 Sec **20 Sec** 30 Sec 40 Sec	Number of seconds POST waits for the USB mass storage device after the start unit command
Device #1	Read only	
Emulation Type	**Auto** Floppy Forced FDD Hard Disk CDROM	If Auto, USB devices less than 530 MB will be emulated as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD (Ex. ZIP drive).

3.2.6 ACPI Configuration Sub-Menu

Use this screen to select options for ACPI. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on this page. The screen is shown below.

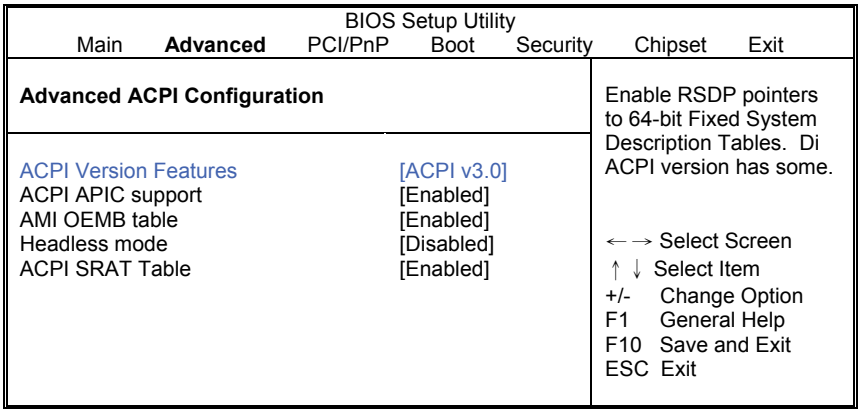


3.2.6.1 General ACPI Configuration Sub-Menu


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
General ACPI Configuration
Suspend Mode [Auto]
Repost Video on S3 Resume [No]
Select the ACPI state used for System Suspend.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

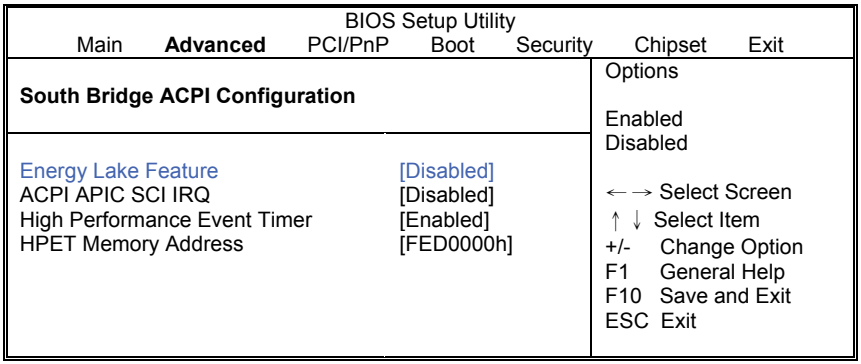
Feature	Option	Description
General ACPI Configuration		
Suspend Mode	S1 (POS) S3 (STR) **Auto**	Select the ACPI state used for System Suspend.
Repost Video on S3 Resume	**No** Yes	Determine whether to invoke VGA BIOS post on S3/STR resume.

3.2.6.2 Advanced ACPI Configuration Sub-Menu


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Advanced ACPI Configuration
ACPI Version Features [ACPI v3.0]
ACPI APIC support [Enabled]
AMI OEMB table [Enabled]
Headless mode [Disabled]
ACPI SRAT Table [Enabled]
Enable RSDP pointers to 64-bit Fixed System Description Tables. Di ACPI version has some.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Advanced ACPI Configuration		
ACPI Version Features	**ACPI v3.0**	Enable RSDP pointers to 64-bit Fixed System Description Tables. Di ACPI version has some.
	ACPI v2.0	
	ACPI v1.0	
ACPI APIC Support	**Enabled**	Include ACPI APIC table pointer to RSDT pointer list.
	Disabled	
AMI OEMB table	**Enabled**	Include OEMB table pointer to R(X)SDT pointer lists.
	Disabled	
Headless mode	Enabled	Enable or disable Headless operation mode through ACPI.
	Disabled	
ACPI SRAT Table	Disabled	Enable or Disable the building of ACPI SRAT Table.
	Enabled	
	NUMA for SLES11	

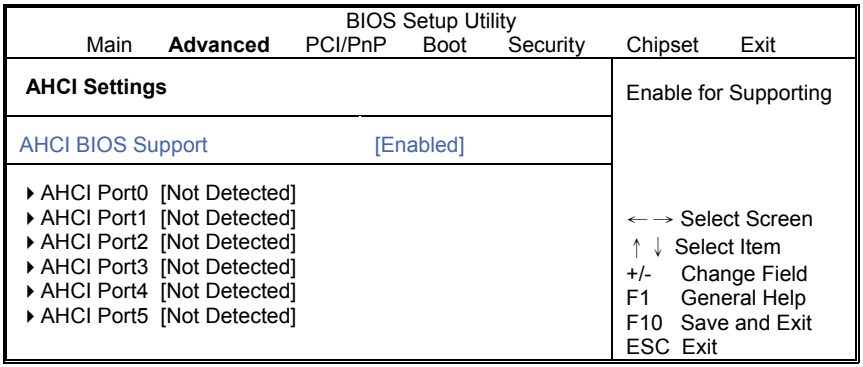
3.2.6.3 Chipset ACPI Configuration Sub-Menu



Feature	Option	Description
Chipset ACPI Configuration		
Energy Lake Feature	**Disabled**	Allow you to configure Intel's Energy Lake power management technology. If you are running a Media Center you can install the Intel VIIV software to get the correct driver; otherwise disable the Energy Lake feature in BIOS (it relates purely to Intel's Quick Resume feature, which is generally useless).
	Enabled	
ACPI APIC SCI IRQ	**Disabled**	Enable / Disable ACPI APIC SCI IRQ
	Enabled	
High Performance Event Timer	**Enabled**	Enable/disable High Performance Event Timer.
	Disabled	
HPET Memory Address	**FED00000h**	Choose HPET Memory Address
	FED01000h	
	FED02000h	
	FED03000h	

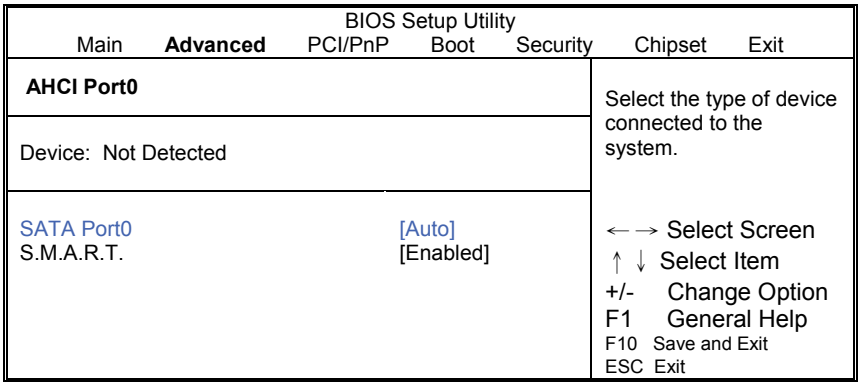
3.2.7 AHCI Configuration Sub-Menu

You can use this screen to view the AHCI Configuration Menu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.



Feature	Option	Description
AHCI Configuration		
AHCI BIOS Support	**Enabled** Disabled	Enable for supporting AHCI.

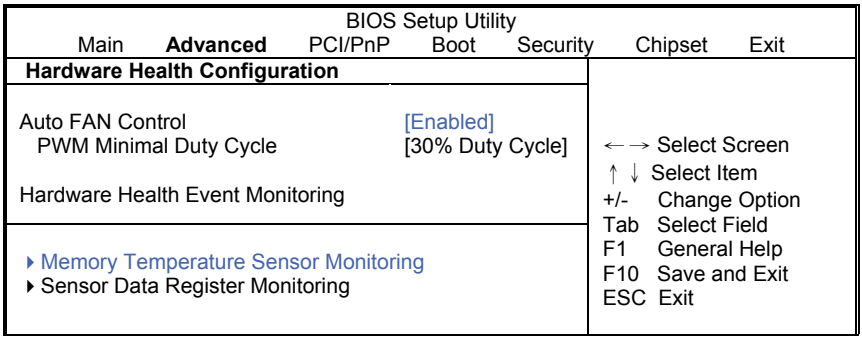
3.2.7.1 AHCI Port0/Port1/Port2/Port3/Port4/Port5 Sub-Menu



Feature	Option	Description
AHCI Port0 Configuration		
SATA Port0	**Auto** Not Installed	Select the type of device connected to the system.
S.M.A.R.T.	**Enabled** Disabled	S.M.A.R.T (Self-Monitoring Analysis and Reporting Technology) is a utility that monitors your disk status to predict hard disk failure.

3.2.8 Hardware Health Configuration Sub-Menu

You can use this screen to view the Hardware Health Configuration Settings. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.



Feature	Option	Description
Hardware Health Configuration		
Auto FAN Control	Disabled	FAN power duty cycle is auto dynamic programmed in selected temperature range. Disabled: Fan Power On. Enabled: Fan Power Duty Cycle=60%—100%, see max (CPUs, SIO) temperature
	Enabled	
PWM Minimal Duty Cycle	60% Duty Cycle	Duty Cycle control range: 60%-100% 45%-100% 30%-100%
	45% Duty Cycle	
	30% Duty Cycle	

3.2.8.1 Memory Temperature Monitoring Sub-Menu

Advanced		
Channel A Temperature (CPU0)	N/A	
Channel B Temperature (CPU0)	N/A	
Channel C Temperature (CPU0)	N/A	
Channel A Temperature (CPU1)	N/A	← Select Screen
Channel A Temperature (CPU1)	N/A	↑ ↓ Select Item
Channel A Temperature (CPU1)	40°C	Tab Select Field
		F1 General Help
		F10 Save and Exit
		ESC Exit

Read only. It can not be modified in user mode.

3.2.8.2 Sensor Data Register Monitoring Sub-Menu

Advanced				
ID#	NAME	READING	STATUS	
01	CPU0 Below Tmax	: xx°C	xx	
02	CPU1 Below Tmax	: xx°C	xx	
03	PCI Area 1 (RT2)	: xx°C	xx	
04	PCI Area 2 (RT4)	: xx°C	xx	
0B	CPU0 VCORE	: x.xxx V	xx	
0C	CPU1 VCORE	: x.xxx V	xx	
0D	3.3V	: x.xxx V	xx	
0E	+12V	: x.xxx V	xx	
0F	VBAT	: x.xxx V	xx	
10	5V	: x.xxx V	xx	
20	Sys. 1 (CPU 0)	: xxxx RPM	xx	
21	Sys. 2 (CPU 1)	: xxxx RPM	xx	
22	Sys. 3 (Front 1)	: xxxx RPM	xx	← Select Screen
23	Sys. 4 (Front 2)	: xxxx RPM	xx	↑ ↓ Select Item
24	Sys. 5 (Rear 1)	: xxxx RPM	xx	F1 General Help
25	Sys. 6	: xxxx RPM	xx	F10 Save and Exit
26	Sys. 7	: xxxx RPM	xx	ESC Exit
▸ SDR Monitoring Next Page				

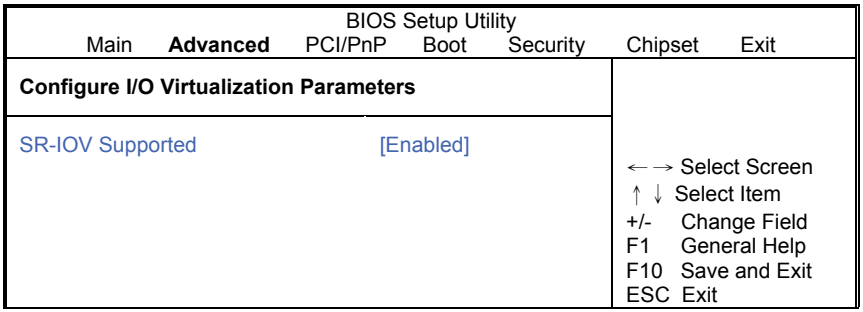
▸ SDR Monitoring Next Page

Advanced				
ID#	NAME	READING	STATUS	
27	Sys. 8	: xxxx RPM	xx	
28	Sys. 9	: xxxx RPM	xx	
29	Sys. 10	: xxxx	xx	
50	PMBUS PowerIN	: xxxx	xx	
51	PSMI PowerIN	: xxxx	xx	

Read only. It can not be modified in user mode.

3.2.9 I/O Virtualization Sub-Menu

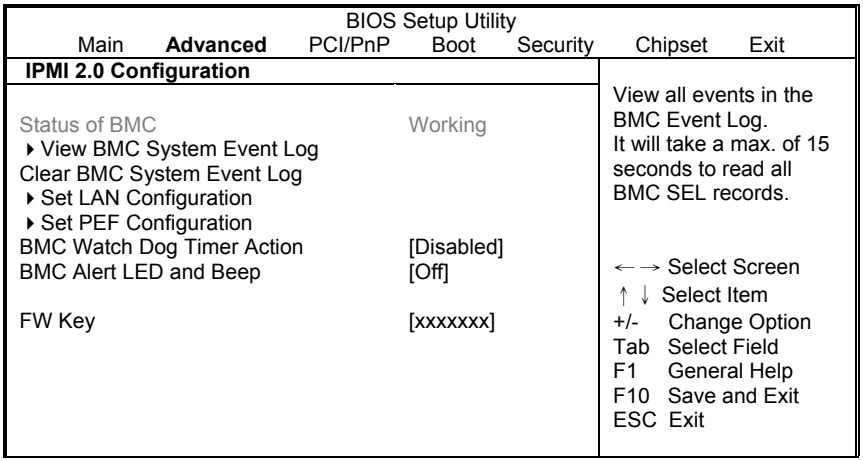
You can use this screen to select the I/O Virtualization Menu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.



Feature	Option	Description
Configure I/O Virtualization Parameters		
SR-IOV Supported	**Enabled** Disabled	Enable or disable SR-IOV support

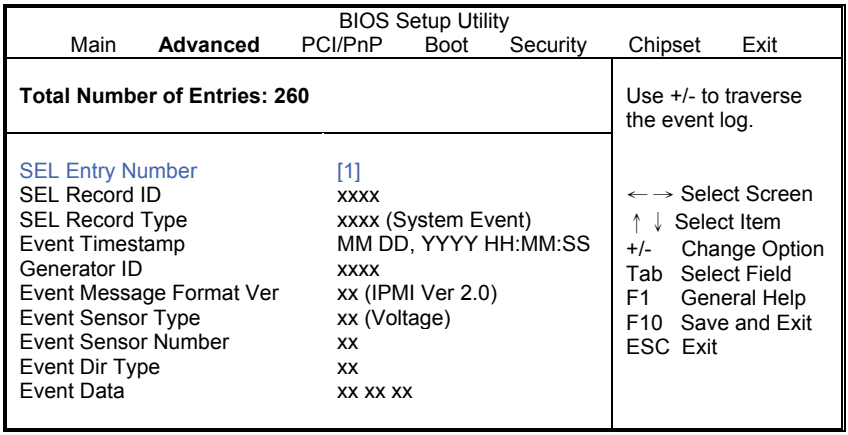
3.2.10 IPMI 2.0 Configuration Sub-Menu

You can use this screen to view the IPMI 2.0 Configuration Settings. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.



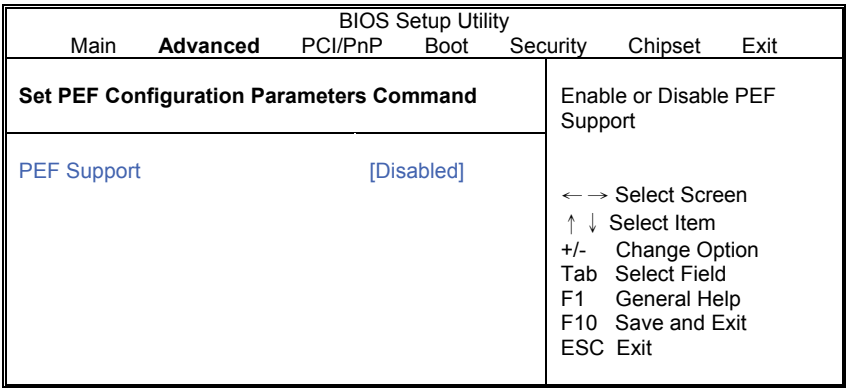
Feature	Option	Description
IPMI 2.0 Configuration		
Status of BMC	Read only	Display BMC status
Clear BMC System Event Log	[Enter]	Clear all events in BMC System Event Log.
BMC Watch Dog Timer Action	**Disabled**	Allows the BMC to reset or power down the system if the operating system crashes or hangs.
	Reset System	
	Power Down	
	Power Cycle	
BMC Alert LED and Beep	**Off**	BMC Alert LED and Beep On/Off
	On	
FW Key	[xxxxxxx]	Enter IPMI FW key to upgrade IPMI or iKVM function

3.2.10.1 View BMC System Event Log Sub-Menu


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Total Number of Entries: 260
SEL Entry Number [1]
SEL Record ID xxxx
SEL Record Type xxxx (System Event)
Event Timestamp MM DD, YYYY HH:MM:SS
Generator ID xxxx
Event Message Format Ver xx (IPMI Ver 2.0)
Event Sensor Type xx (Voltage)
Event Sensor Number xx
Event Dir Type xx
Event Data xx xx xx
Use +/- to traverse the event log.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
Tab Select Field
F1 General Help
F10 Save and Exit
ESC Exit

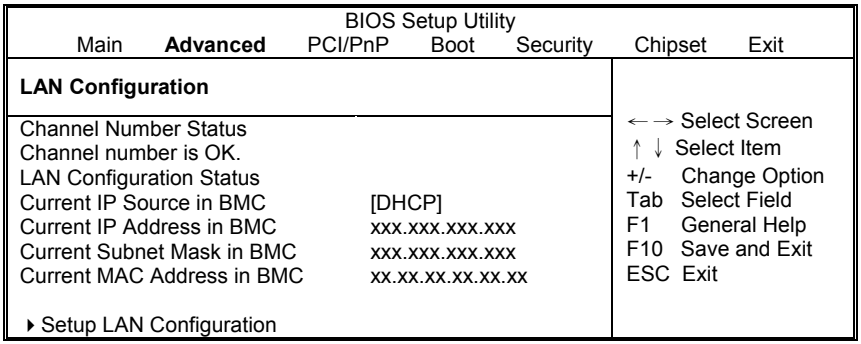
Read only. It can not be modified in user mode.

3.2.10.2 Set PEF Configuration Sub-Menu



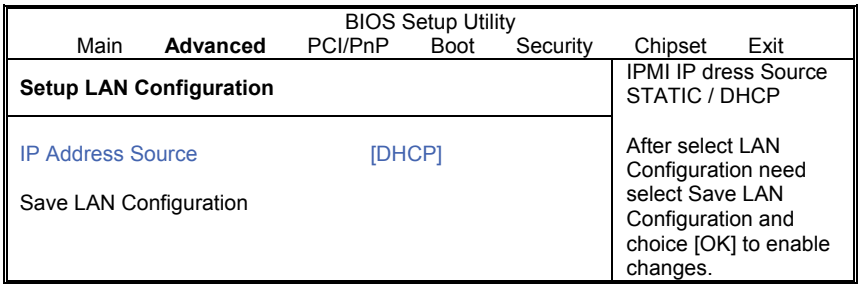
Feature	Option	Description
Set PEF Configuration Parameters Command		
PEF Support	**Disabled** Enabled	Enable or Disable PEF Support

3.2.10.3 Set LAN Configuration Sub-Menu


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
LAN Configuration
Channel Number Status
Channel number is OK.
LAN Configuration Status
Current IP Source in BMC [DHCP]
Current IP Address in BMC xxx.xxx.xxx.xxx
Current Subnet Mask in BMC xxx.xxx.xxx.xxx
Current MAC Address in BMC xx.xx.xx.xx.xx.xx
Setup LAN Configuration
← → Select Screen
↑ ↓ Select Item
+/- Change Option
Tab Select Field
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
LAN Configuration		
Channel Number Status	Read only	
Current IP Source in BMC	Read Only	
Current IP Address in BMC	Read only	
Current Subnet Address in BMC	Read only	
Current MAC Mask in BMC	Read only	

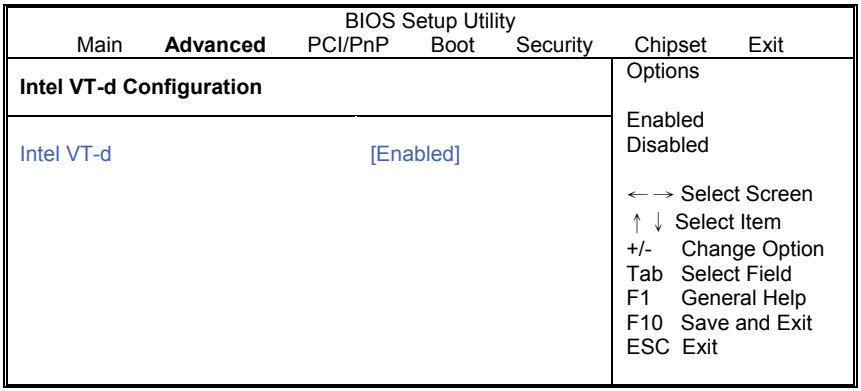
3.2.10.4 Setup LAN Configuration Sub-Menu


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Setup LAN Configuration
IP Address Source [DHCP]
Save LAN Configuration
IPMI IP dress Source
STATIC / DHCP
After select LAN Configuration need select Save LAN Configuration and choice [OK] to enable changes.

Feature	Option	Description
Setup LAN Configuration		
IP Address Source	STATIC **DHCP**	Select IPMI IP Address Source
Save LAN Configuration	Select [OK]	

3.2.11 Intel VT-d Configuration Sub-Menu

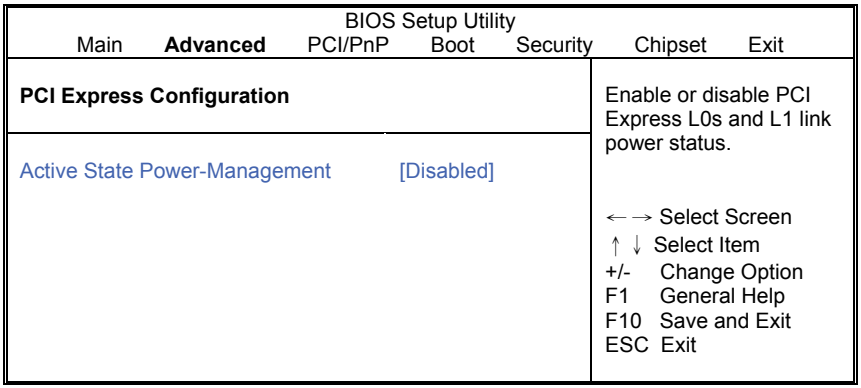
You can use this screen to view the Intel VT-d Configuration Settings. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.



Feature	Option	Description
Intel VT-d Configuration		
Intel VT-d	**Enabled**	Enable or disable Intel® Virtualization Technology for Directed I/O (VT-d) support. VT-d support on Intel platforms provides the capability to ensure improved isolation of I/O resources for greater reliability, security, and availability.
	Disabled	

3.2.12 PCI Express Configuration Sub-Menu

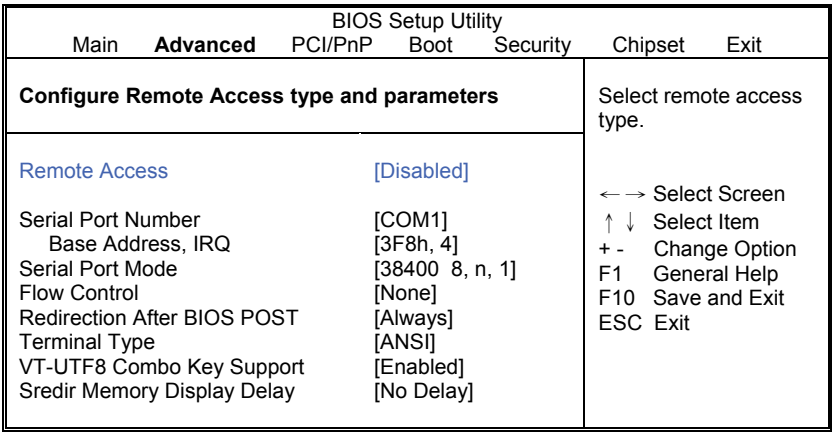
You can use this screen to configure the PCI Express Support. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
PCI Express Configuration
Active State Power-Management [Disabled]
Enable or disable PCI Express L0s and L1 link power status.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
PCI Express Configuration		
Active State Power-Management	Enabled	Enable/disable PCI Express L0s and L1 link power status.
	Disabled	

3.2.13 Remote Access Configuration Sub-Menu

You can use this screen to view the Remote Access Configuration Menu. This feature allows access to the Server remotely via serial port. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

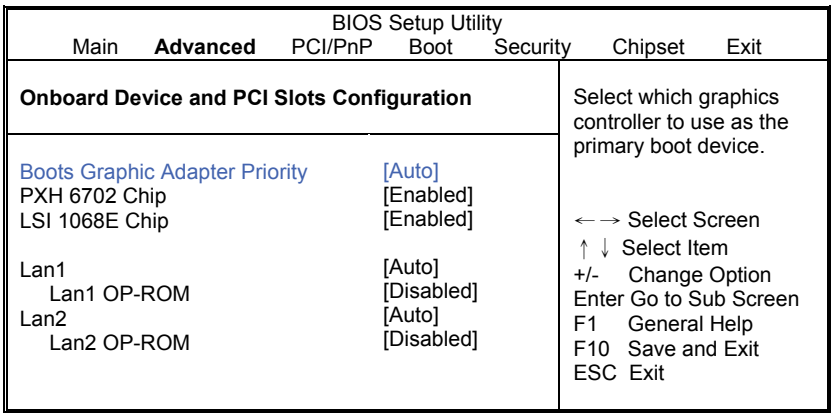

BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Configure Remote Access type and parameters
Select remote access type.
Remote Access [Disabled]
Serial Port Number [COM1]
Base Address, IRQ [3F8h, 4]
Serial Port Mode [38400 8, n, 1]
Flow Control [None]
Redirection After BIOS POST [Always]
Terminal Type [ANSI]
VT-UTF8 Combo Key Support [Enabled]
Sredir Memory Display Delay [No Delay]
← → Select Screen
↑ ↓ Select Item
+ - Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Configure Remote Access type and parameters		
Remote Access	**Disabled**	Enables remote access to system through serial port.
	Enabled	
NOTE: The items listed below will appear when Remote Access is set to [Enabled].		
Serial Port Number	**COM1**	Select Serial Port for console redirection. Make sure the selected port is enabled.
	COM2	
Base Address, IRQ	Read only	
Serial Port Mode	115200 8,n,1	Select Serial Port settings.
	57600 8,n,1	
	38400 8, n, 1	
	19200 8,n,1	
	9600 8,n,1	
Flow Control	**None**	Select Flow Control for console redirection.
	Hardware	
	Software	

Feature	Option	Description
Configure Remote Access type and parameters		
Redirection After BIOS POST	Disabled	Disable: Turns off the redirection after POST Boot Loader: Redirection is active during POST and during Boot Loader. Always: Redirection is always active. <Some OSs may not work if set to Always>
	Boot Loader	
	Always	
Terminal Type	**ANSI**	Select the target terminal type.
	VT100	
	VT-UTF8	
VT-UTF8 Combo Key Support	**Enabled**	Enable VT-UTF8 Combination key Support for ANSI/VT100 terminals.
	Disabled	
Sredir Memory Display Delay	**No Delay**	Gives the delay in seconds to display memory information
	Delay 1 Sec	
	Delay 2 Sec	
	Delay 4 Sec	

3.2.14 Onboard Devices Configuration Sub-Menu

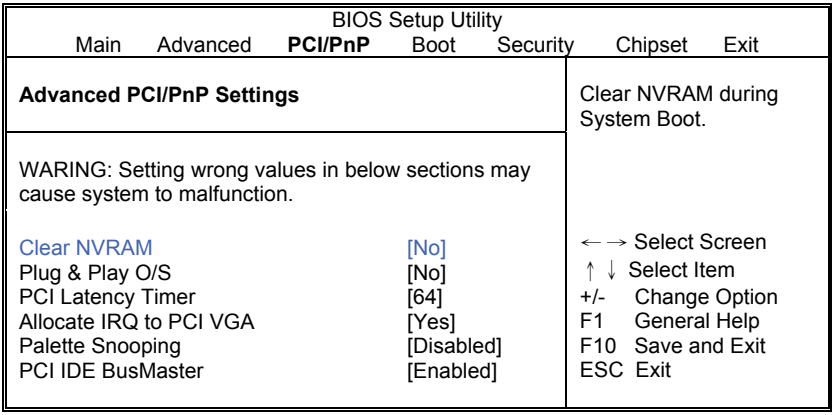
You can use this screen to view the Onboard Devices Configuration Menu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Onboard Device and PCI Slots Configuration
Boots Graphic Adapter Priority [Auto]
PXH 6702 Chip [Enabled]
LSI 1068E Chip [Enabled]
Lan1 [Auto]
Lan1 OP-ROM [Disabled]
Lan2 [Auto]
Lan2 OP-ROM [Disabled]
Select which graphics controller to use as the primary boot device.
←→ Select Screen
↑ ↓ Select Item
+/- Change Option
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Onboard Device and PCI Slots Configuration		
Boots Graphic Adapter Priority	**Auto**	Select which graphics controller to use as the primary boot device.
	Onboard VGA	
PXH 6702/LSI 1068E Chip	**Enabled**	Enable/disable onboard PXH 6702/LSI 1068E chipset.
	Disabled	
Lan1/Lan2	**Auto**	Enable/disable Lan controller
	Enabled	
	Disabled	
Lan1/Lan2 OP-ROM	Enabled	Executed Lan OP-ROM or not
	Disabled	

3.3 PCI PnP Menu

You can use this screen to view PnP (Plug & Play) BIOS Configuration Menu. This menu allows the user to configure how the BIOS assigns resources & resolves conflicts. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Advanced PCI/PnP Settings
WARING: Setting wrong values in below sections may cause system to malfunction.
Clear NVRAM [No]
Plug & Play O/S [No]
PCI Latency Timer [64]
Allocate IRQ to PCI VGA [Yes]
Palette Snooping [Disabled]
PCI IDE BusMaster [Enabled]
Clear NVRAM during System Boot.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Advanced PCI/PnP Settings		
Clear NVRAM	**No**	Clears NVRAM during system Boot.
	Yes	
Plug & Play OS	Yes	No: lets the BIOS configure all the devices in the system. Yes: lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.
	No	
PCI Latency Timer	32	This setting controls how many PCI clocks each PCI device can hold the bus before another PCI device takes over. When set to higher values, every PCI device can conduct transactions for a longer time and thus improve the effective PCI bandwidth. Values in units of PCI clocks for PCI device latency timer register.
	64	
	96	
	128	
	160	
	192	
	224	
	248	

Allocate IRQ to PCI VGA	**Yes**	Yes: assigns IRQ to PCI VGA card if card requests IRQ.
	No	
Palette Snooping	**Disabled**	This is the default setting and should not be changed unless the VGA card manufacturer requires Palette Snooping to be Enabled. Enabled: informs the PCI devices that an ISA graphics device is installed in the system so the card will function correctly.
	Enabled	
PCI IDE BusMaster	Disabled	Enabled: BIOS uses PCI bus mastering for reading / writing to IDE drives.
	Enabled	

3.4 Boot Menu

You can display Boot Setup option by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.

BIOS Setup Utility Main Advanced PCI/PnP **Boot** Security Chipset Exit	
Boot Settings	Configures settings during System Boot.
▸ Boot Settings Configuration ▸ Boot Device Priority ▸ Hard Disk Drives ▸ Removable Drives	←→ Select Screen ↑ ↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit

3.4.1 Boot Settings Configuration Sub-Menu

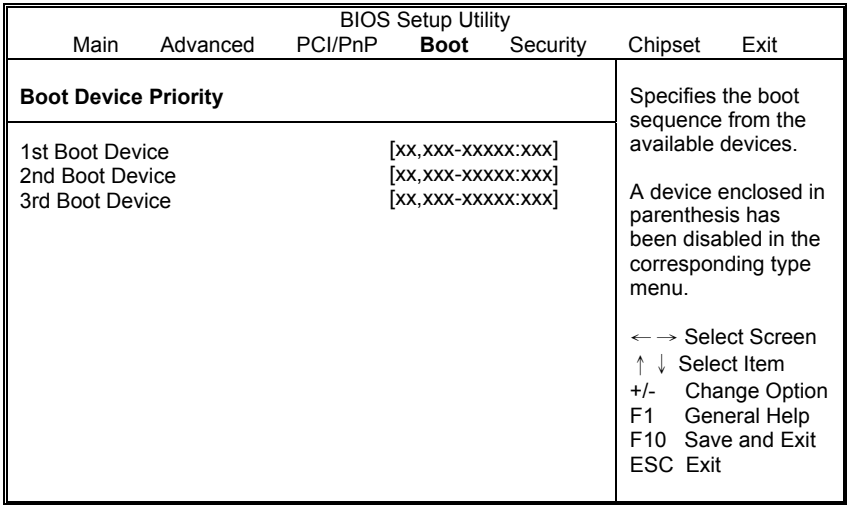
Use this screen to select options for the Boot Settings Configuration. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

BIOS Setup Utility Main Advanced PCI/PnP **Boot** Security Chipset Exit		
Boot Settings Configuration		Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system. ←→ Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit
Quick Boot	[Disabled]	
Quiet Boot	[Disabled]	
AddOn ROM Display Mode	[Force BIOS]	
Bootup Num-Lock	[On]	
Wait for 'F1' if Error	[Enabled]	
Hit 'DEL' Message Display	[Enabled]	
Interrupt 19 Capture	[Enabled]	
Endless Boot	[Disabled]	

Feature	Option	Description
Boot Settings Configuration		
Quick Boot	Enabled **Disabled**	This option allows user bypass BIOS self test during POST.
Quiet Boot	**Disabled** Enabled	Disabled: displays normal POST messages. Enabled: displays OEM log instead of POST messages.
Add On ROM Display Mode	**Force BIOS** Keep Current	Allows user to force BIOS/Option ROM of add-on cards to be displayed during quiet boot.
Bootup Num-Lock	**On** Off	Selects Power-on state for Numlock.
Wait for 'F1' If Error	**Enabled** Disabled	Waits for F1 key to be present if error occurs.
Hit 'DEL' Message Display	**Enabled** Disabled	Displays "Press DEL to run Setup" in POST.
Interrupt 19 Capture	Disabled **Enabled**	Enabled: allows option ROMs to trap interrupt 19.
Endless Boot	**Disabled** Enabled	Enable/Disable endless loop boot from BBS table.

3.4.2 Boot Device Priority

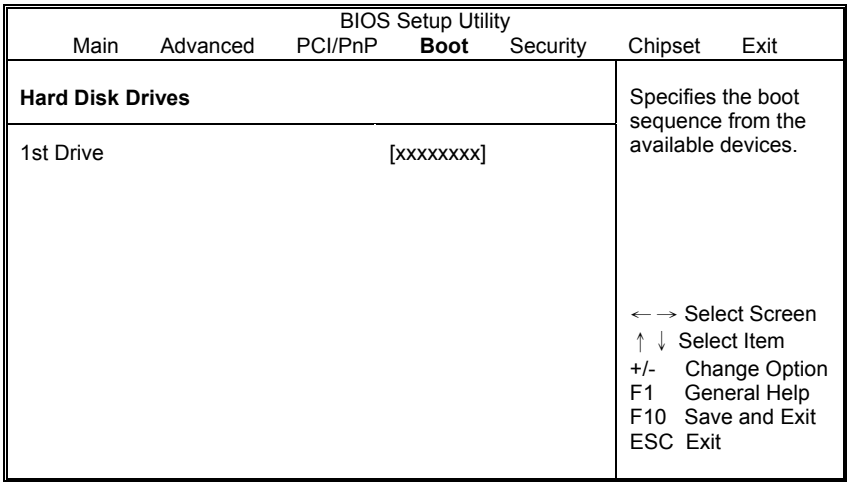
Use this screen to select options for the Boot Device Priority. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Boot Device Priority
1st Boot Device [xx,xxx-xxxxx:xxx]
2nd Boot Device [xx,xxx-xxxxx:xxx]
3rd Boot Device [xx,xxx-xxxxx:xxx]
Specifies the boot sequence from the available devices.
A device enclosed in parenthesis has been disabled in the corresponding type menu.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Boot Device Priority		
1st Boot Device 2nd Boot Device 3rd Boot Device	**xx,xxx-xxxxx:xxx**	Settings for boot priority. These can be customized depending on your preference.
	xx,xxx-xxxxx:xxx	
	Disabled	

3.4.3 Hard Disk Drives

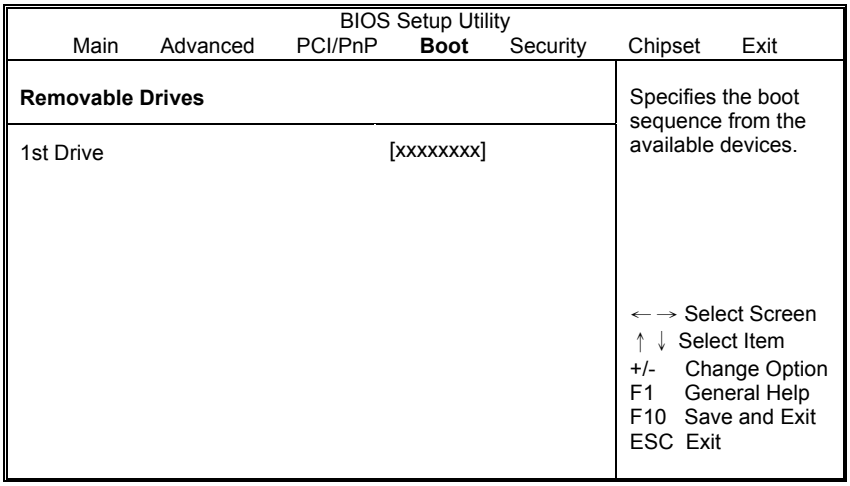
Use this screen to select options for the Hard Disk Drives. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.



Feature	Option	Description
Hard Disk Drives		
1st Drive	**xx,xxx-xxxxx:xxx** Disabled	Specifies the boot sequence from the available devices.

3.4.4 Removable Drives

Use this screen to select options for the Removable Drives. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.



Feature	Option	Description
Removable Drives		
1st Drive	**xx,xxx-xxxxx:xxx**	Specifies the boot sequence from the available devices.

3.5 Security Menu

The system can be configured so that all users must enter a password every time the system boots or when BIOS Setup is entered, using either the Supervisor password or User password. The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a one to six character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must clear CMOS and reconfigure.

BIOS Setup Utility Main Advanced PCI/PnP Boot **Security** Chipset Exit	
Security Settings	Install or change the password.
Supervisor Password : Not Installed User Password : Not Installed Change Supervisor Password Change User Password Boot Sector Virus Protection [Disabled]	←→ Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit

Feature	Option	Description
Security Settings		
Supervisor Password:	**Not Installed** Installed	If the password has been set, Installed displays. If no password is set, Not Installed displays.
User Password:	**Not Installed** Installed	If the password has been set, Installed displays. If no password is set, Not Installed displays.
Change Supervisor Password	—	Selects this option to change or install Supervisor Password.
Change User Password	—	Selects this option to change or install User Password.
Boot Sector Virus Protection	**Disabled** Enabled	When it is set to [Enabled], BIOS will issue a virus warning message and beep if a write to the boot sector or the partition table of the HDD is attempted.

3.6 Chipset Menu

This menu allows the user to customize functions of the Intel Chipsets. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.

<table>
<tr><td colspan="2">BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit</td></tr>
<tr><td>Advanced Chipset Settings</td><td rowspan="2">Configure CPU Bridge features.

←→ Select Screen
↑ ↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit</td></tr>
<tr><td>WARNING: Setting wrong values in below sections may cause system to malfunction.

▸ CPU Bridge Configuration
▸ North Bridge Configuration
▸ South Bridge Configuration
▸ ME Subsystem Configuration
▸ Watchdog Timer Configuration</td></tr>
</table>

3.6.1 CPU Bridge Configuration Sub-Menu

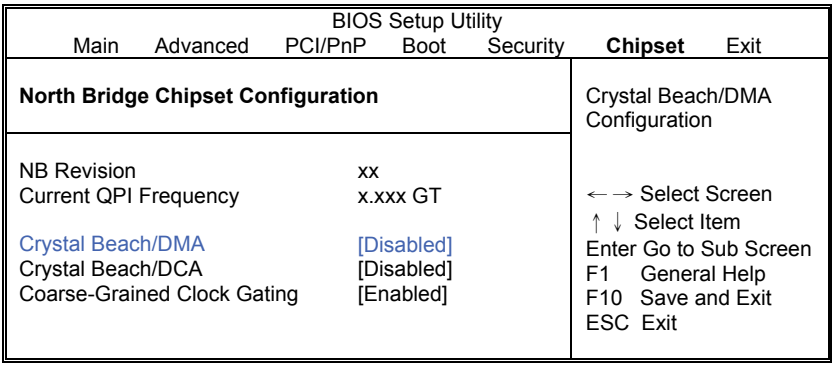
This menu gives options for customizing CPU Bridge Chipset settings. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.

BIOS Setup Utility Main Advanced PCI/PnP Boot Security **Chipset** Exit	
CPU Bridge Chipset **Configuration**	Transition the links to the specified speed when transitioning the links to full-speed. (if supported by all components)
CPU Revision xx Current QPI Frequency x.xxx GT Current Memory Frequency x.xxx GT	
QPI Frequency [Auto] QPI L0s and L2 [Disabled]	←→ Select Screen ↑ ↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit
Memory Frequency [Auto] Memory Mode [Independent] Demand Scrubbing [Disabled] Patrol Scrubbing [Disabled]	

Feature	Option	Description
North Bridge Chipset Configuration		
CPU Revision Current QPI Frequency Current Memory Frequency	Read only	
QPI Frequency	**Auto** 4.800 GT 5.866 GT 6.400 GT	Transition the links to the specified speed when transitioning the links to full-speed. (if supported by all components)
QPI L0s and L1	**Disabled** Enabled	Enable/disable L0s and L1
Memory Frequency	**Auto** Force DDR-800 Force DDR-1066 Force DDR-1333	Force a DDR frequency slower than the command tCK detected via SPD
Memory Mode	**Independent** Channel Mirroring Lockstep Sparing	Independent: independent channel Mirroring: mirrors channel space between channels Lockstep: lockstep between channel 0 and 1 Spare: sparing mode
Demand Scrubbing	**Disabled** Enabled	ECC demand scrubbing enabled / disabled
Patrol Scrubbing	**Disabled** Enabled	ECC patrol scrubbing enabled / disabled

3.6.2 North Bridge Configuration Sub-Menu

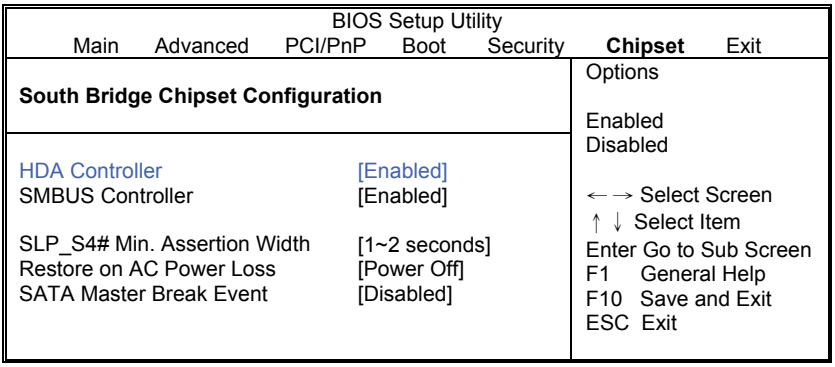
This menu gives options for customizing North Bridge Chipset settings. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.



Feature	Option	Description
North Bridge Chipset Configuration		
NB Revision	Read only	
Current QPI Frequency		
Crystal Beach/DMA	**Disabled**	Crystal Beach/DMA Configuration
	Enabled	
NOTE: The item listed below will appear when **Crystal Beach/DMA** is set to [Enabled].		
Crystal Beach/DCA	**Disabled**	Crystal Beach/DCA Configuration
	Enabled	
Coarse-Grained Clock Gating	**Enabled**	Enable/disable Coarse-Grained Clock Gating
	Disabled	

3.6.3 South Bridge Configuration Sub-Menu

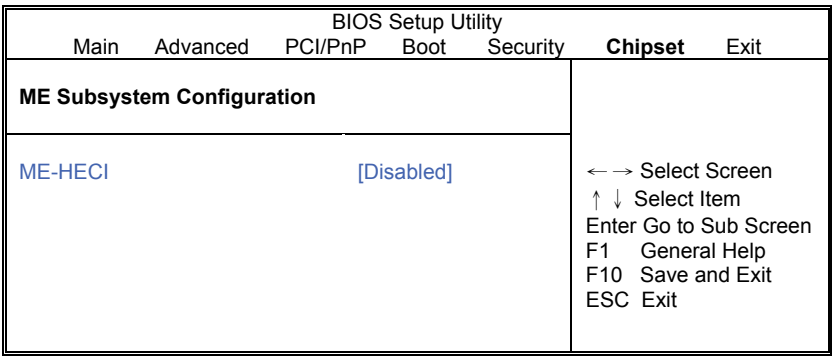
This menu gives options for customizing South Bridge Chipset settings. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.



Feature	Option	Description
South Bridge Chipset Configuration		
HDA Controller (optional for BTO)	**Enabled** Disabled	Enable or disable HDA controller
SMBUS Controller	**Enabled** Disabled	Enable or disable SMBUS controller
SLP_S4# Min. Assertion Width	4-5 seconds 3-4 seconds 2-3 seconds **1-2 seconds**	Select Timing for SLP_S4#
Restore on AC Power Loss	**Power Off** Power On Last State	Configure how the system board responds to a power failure.
SATA Master Break Event	Enabled **Disabled**	SATA master activity will cause a break from C3/C6 state if enabled.

3.6.4 ME Subsystem Configuration Sub-Menu

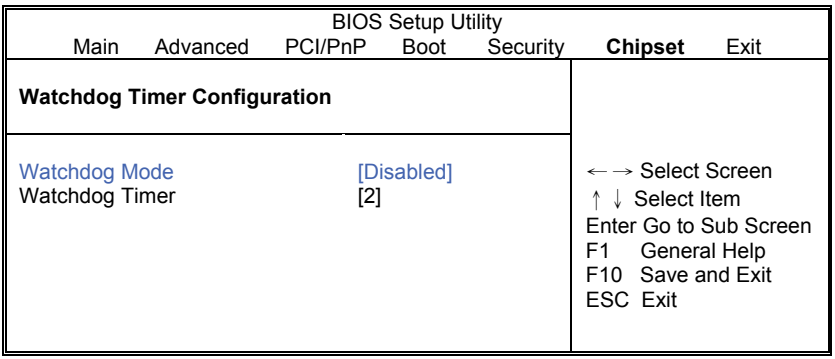
This menu provides selection for ME subsystem configuration. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.



Feature	Option	Description
South Bridge Chipset Configuration		
ME-HECI	Enabled **Disabled**	Enable or disable ME-HECI

3.6.5 Watchdog Timer Configuration Sub-Menu

This menu provides selection for Watchdog Timer configuration. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.



Feature	Option	Description
Watchdog Timer Configuration		
Watchdog Mode	POST	POST: BIOS POST Watchdog, timer counting start at PowerON, stop at OS boot. OS: OS boot Watchdog, start at OS boot. PowerON: Start on PowerON
	OS	
	PowerON	
	Disabled	
Watchdog Timer	**2**	Watchdog timer sets 2/4/6/8/10/12 minutes. When WD time-out occurs, system will auto reboot.
	4	
	6	
	8	
	10	
	12	

3.7 Exit Menu

You can display an Exit BIOS Setup option by highlighting it Arrow (↑/↓) keys and pressing Enter.

BIOS Setup Utility Main Advanced PCI/PnP Boot Security Chipset Exit	
Exit **Options**	Exit system setup after saving the changes. F10 key can be used for this operation. ←→ Select Screen ↑ ↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit
Save Changes and Exit Discard Changes and Exit Discard Charges Load Optimal Defaults Load Failsafe Defaults	

Save Changes and Exit
Use this option to exit setup utility and re-boot.
All new selections you have made are stored into CMOS.
System will use the new settings to boot up.

Discard Changes and Exit
Use this option to exit setup utility and re-boot.
All new selections you have made are not stored into CMOS.
System will use the old settings to boot up.

Discard Changes
Use this option to restore all new setup values that you have made but not saved into CMOS.

Load Optimal Defaults
Use this option to load default performance setup values.
Use this option when system CMOS values have been corrupted or modified incorrectly.

Load Failsafe Defaults
Use this option to load all default failsafe setup values.
Use this option when troubleshooting.

Chapter 4: Diagnostics

NOTE: if you experience problems with setting up your system, always check the following things in the following order:

Memory, Video, CPU

By checking these items, you will most likely find out what the problem might have been when setting up your system. For more information on troubleshooting, check the TYAN website at: http://www.tyan.com.

4.1 Beep Codes

Fatal errors, which halt the boot process, are communicated through two kinds of audible beeps.

- Eight short beeps: It indicates that a video error has occurred.
- A single long beep repeatedly: It indicates that a DRAM error has occurred.

The most common type of error is a memory error.

Before contacting your vendor or TYAN Technical Support, be sure that you note as much as you can about the beep code length and order that you experience. Also, be ready with information regarding add-in cards, drives and O/S to speed the support process and come to a quicker solution.

4.2 Flash Utility

Every BIOS file is unique for the motherboard it was designed for. For Flash Utilities, BIOS downloads, and information on how to properly use the Flash Utility with your motherboard, please check the TYAN web site: http://www.tyan.com/

NOTE: Please be aware that by flashing your BIOS, you agree that in the event of a BIOS flash failure, you must contact your dealer for a replacement BIOS. There are no exceptions. TYAN does not have a policy for replacing BIOS chips directly with end users. In no event will TYAN be held responsible for damages done by the end user.

4.3 AMIBIOS Post Code

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer.Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.

Checkpoint	Description
38	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information.
39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, … etc.) successfully installed in the system and update the BDA, EBDA…etc.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested.
8C	Late POST initialization of chipset registers.
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for Int 19 boot.
AC	End of POST initialization of chipset registers.
B1	Save system context for ACPI.
00	Passes control to OS Loader (typically INT19h).

NOTE

Glossary

ACPI (Advanced Configuration and Power Interface): a power management specification that allows the operating system to control the amount of power distributed to the computer's devices. Devices not in use can be turned off, reducing unnecessary power expenditure.

AGP (Accelerated Graphics Port): a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs at only 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

ATAPI (AT Attachment Packet Interface): also known as IDE or ATA; a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like HDDs.

ATX: the form factor designed to replace the AT form factor. It improves on the AT design by rotating the board 90 degrees, so that the IDE connectors are closer to the drive bays, and the CPU is closer to the power supply and cooling fan. The keyboard, mouse, USB, serial, and parallel ports are built-in.

Bandwidth: refers to carrying capacity. The greater the bandwidth, the more data the bus, phone line, or other electrical path, can carry. Greater bandwidth, then, also results in greater speed.

BBS (BIOS Boot Specification): is a feature within the BIOS that creates, prioritizes, and maintains a list of all Initial Program Load (IPL) devices, and then stores that list in NVRAM. IPL devices have the ability to load and execute an OS, as well as provide the ability to return to the BIOS if the OS load process fails for some reason. At that point, the next IPL device is called upon to attempt loading of the OS.

BIOS (Basic Input/Output System): the program that resides in the ROM chip, and provides the basic instructions for controlling your computer's hardware. Both the operating system and application software use BIOS routines to ensure compatibility.

Buffer: a portion of RAM which is used to temporarily store data, usually from an application, though it is also used when printing, and in most keyboard drivers. The CPU can manipulate data in a buffer before copying it, all at once, to a disk drive. While this improves system performance --- reading to or writing from a disk drive a single time is much faster than doing so repeatedly --- there is also the possibility of losing your data should the system crash. Information stored in a buffer is temporarily stored, not permanently saved.

Bus: a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses.

Bus mastering: allows peripheral devices and IDEs to access the system memory without going through the CPU (similar to DMA channels).

Cache: a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times, since the needed information is stored in the SRAM instead of in the slow DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 4GB of regular memory.

Cache size: refers to the physical size of the cache onboard. This should not be confused with the cacheable area, which is the total amount of memory which can be scanned by the system in search of data to put into the cache. A typical setup would be a cache size of 512KB, and a cacheable area of 512MB. In this case, up to 512KB of the main memory onboard is capable of being cached. However, only 512KB of this memory will be in the cache at any given moment. Any main memory above 512MB could never be cached.

Closed and open jumpers: jumpers and jumper pins are active when they are “on” or “closed”, and inactive when they are “off” or “open”.

CMOS (Complementary Metal-Oxide Semiconductors): chips that hold the basic startup information for the BIOS.

COM port: another name for the serial port, which is called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another). Parallel ports transmit the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

DDR (Double Data Rate): is a technology designed to double the clock speed of the memory. It activates output on both the rising and falling edge of the system clock rather than on just the rising edge, potentially doubling output.

DIMM (Dual In-line Memory Module): faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

DIMM bank: sometimes called DIMM sockets, because the physical slot and the logical unit are the same. That is, one DIMM module fits into one DIMM socket, which is capable of acting as a memory bank.

DMA (Direct Memory Access): channels that are similar to IRQs. DMA channels allow hardware devices (like soundcards or keyboards) to access the main memory without involving the CPU. This frees up CPU resources for other tasks. As with

IRQs, it is vital that you do not double up devices on a single line. Plug-n-Play devices will take care of this for you.
Doze mode: in this mode, only the CPU's speed is slowed.
DRAM (Dynamic RAM): widely available, very affordable form of RAM which has the unfortunate tendency to lose data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM three to ten times slower than non-recharged RAM such as SRAM.

ECC (Error Correction Code or Error Checking and Correcting): allows data to be checked for errors during run-time. Errors can subsequently be corrected at the same time that they're found.

EEPROM (Electrically Erasable Programmable ROM): also called Flash BIOS, is a ROM chip which can, unlike normal ROM, be updated. This allows you to keep up with changes in the BIOS programs without having to buy a new chip. TYAN's BIOS updates can be found at http://www.tyan.com

ESCD (Extended System Configuration Data): a format for storing information about Plug-n-Play devices in the system BIOS. This information helps properly configure the system each time it boots.

Fault-tolerance: a term describing a system where one component can quickly be replaced without causing a loss of service, such as in a RAID system.

Firmware: low-level software that controls the system hardware.

Form factor: an industry term for the size, shape, power supply type, and external connector type of the Personal Computer Board (PCB) or motherboard. The standard form factors are the AT and ATX, although TYAN also makes some Baby-AT and ATX Footprint boards.

Global timer: onboard hardware timer, such as the Real-Time Clock (RTC).

Handshaking: a process where two devices initiate communications. One device, typically the server, sends a message to another device, typically a client, in order to request establishment of a communications channel. The two devices will then exchange messages back and forth in order to settle on a communications protocol.

HDD: stands for Hard Disk Drive, a type of fixed drive.

H-SYNC: controls the horizontal synchronization/properties of the monitor.

IC (Integrated Circuit): the formal name for the computer chip.

IDE (Integrated Device/Drive Electronics): a simple, self-contained HDD interface. It can handle drives up to 8.4 GB in size. Almost all IDEs sold now are in fact Enhanced IDEs (EIDEs), with maximum capacity determined by the hardware controller.

I/**O (Input/Output):** the connection between your computer and another piece of hardware (mouse, keyboard, etc.)
Initial Program Load (IPL): a feature built into BBS-compliant devices, describing those devices as capable of loading and executing an OS, as well as being able to provide control back to the BIOS if the loading attempt fails.

IPL: see Initial Program Load.

IRQ (Interrupt Request): an electronic request that runs from a hardware device to the CPU. The interrupt controller assigns priorities to incoming requests and delivers them to the CPU. It is important that there is only one device hooked up to each IRQ line; doubling up devices on IRQ lines can lock up your system. Plug-n-Play operating systems can take care of these details for you.

ISA (Industry Standard Architecture): a slower 8- or 16-bit bus (data pathway).

Latency: the amount of time that one part of a system spends waiting for another part to catch up. This is most common when the system sends data out to a peripheral device, and it waiting for the peripheral to send some data back (peripherals tend to be slower than onboard system components).

Mirroring: see RAID.

NVRAM: ROM and EEPROM are both examples of Non-Volatile RAM, memory that holds its data without power. DRAM, in contrast, is volatile.

OEMs (Original Equipment Manufacturers): Compaq or IBM package other companies' motherboards and hardware inside their case and sell them.

Parallel port: transmits the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

PCI (Peripheral Component Interconnect): a 32 or 64-bit local bus (data pathway) which is faster than the ISA bus. Local buses are those which operate within a single system (as opposed to a network bus, which connects multiple systems).

PCI PIO (PCI Programmable Input/Output) modes: the data transfer modes used by IDE drives. These modes use the CPU for data transfer (in contrast, DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.

PCI-to-PCI bridge: allows you to connect multiple PCI devices onto one PCI slot.

Pipeline burst SRAM: a type of RAM that can maintain it's data as long as power is provided to the memory chips. In this configuration, SRAM requests are pipelined, which means that larger packets of data are sent to the memory at one time, and acted upon quickly. This type of SRAM operates at bus speeds higher than 66MHz.

PM timers (Power Management timers): software timers that count down the number of seconds or minutes until the system times out and enters sleep, suspend, or doze mode.
PnP (Plug-n-Play): a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. Novice end users can simply plug them into a computer that is running on a Plug-n-Play aware operating system (such as Windows 98), and go to work. Devices and operating systems that are not Plug-n-Play require you to reconfigure your system each time you add or change any part of your hardware.

RAID (Redundant Array of Independent Disks): a way for the same data to be stored in different places on many hard drives. By using this method, the data is stored redundantly, also the multiple hard drives will appear as a single drive to the operating system. RAID level 0 is known as striping, where data is striped (or overlapped) across multiple hard drives, but offers no fault-tolerance. RAID level 1 is known as mirroring, which stores the data within at least two hard drives, but does not stripe. RAID level 1 also allows for faster access time and fault-tolerance, since either hard drive can be read at the same time. RAID level 0+1 is both striping and mirroring, providing fault-tolerance, striping, and faster access all at the same time.

RAIDIOS: stands for RAID I/O Steering, a type of RAID technology from Intel. RAIDIOS is a specification used to enable an embedded I/O controller, embedded on the motherboard, to be used as just an I/O controller or to be the I/O component of a hardware RAID subsystem. The RAIDIOS circuit allows an I/O Processor (either embedded on the motherboard or on an add-in card) to configure the I/O controller and service the I/O controller's interrupts. The I/O controller and the I/O Processor together are two of the primary components of a hardware RAID subsystem.

RAM (Random Access Memory): technically refers to a type of memory where any byte can be accessed without touching the adjacent data, is often used to refer to the system's main memory. This memory is available to any program running on the computer.

ROM (Read-Only Memory): a storage chip which contains the BIOS; the basic instructions required to boot the computer and start up the operating system.

SATA (Serial ATA): is an evolutionary replacement for the Parallel ATA physical storage interface. Serial ATA is a drop-in solution in that it is compatible with today's software and operating systems. It will provide for systems which are easier to design, with cables that are simpler to route and install, smaller cable connectors, and lower voltage requirements.

SDRAM (Synchronous Dynamic RAM): called as such because it can keep two sets of memory addresses open simultaneously. By transferring data alternately from one set of addresses and then the other, SDRAM cuts down on the delays

associated with non-synchronous RAM, which must close one address bank before opening the next.

Serial port: called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another).

SIMM (Single In-line Memory Module): formally the most common form of RAM for motherboards. They must be installed in pairs, and do not have the carrying capacity or the speed of DIMM modules.

Sleep/Suspend mode: in this mode, all devices except the CPU shut down.

SRAM (Static RAM): unlike DRAM, this type of RAM does not need to be refreshed in order to prevent data loss. Thus, it is faster and more expensive.

SSI (Server System Infrastructure): an industry initiative intended to provide ready-to-use design specifications for common server hardware elements (chassis, power supplies, and racks) to promote and support server industry growth.

Standby mode: in this mode, the video and hard drives shut down; all other devices continue to operate normally.

Striping: see RAID

UltraDMA-33/66/100: a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without proper UltraDMA controller, your system cannot take advantage of higher data transfer rates of the new UltraDMA/UltraATA hard drives.

USB (Universal Serial Bus): a versatile port. This one port type can function as a serial, parallel, mouse, keyboard or joystick port. It is fast enough to support video transfer, and is capable of supporting up to 127 daisy-chained peripheral devices.

VGA (Video Graphics Array): the PC video display standard

V-SYNC: controls the vertical scanning properties of the monitor.

ZIF Socket (Zero Insertion Force socket): these sockets make it possible to insert CPUs without damaging the sensitive CPU pins. The CPU is lightly placed in an open ZIF socket, and a lever is pulled down. This shift the processor over and down, guiding into the board and locking it into place.

Technical Support

If a problem arises with your system, you should turn to your dealer for help first. Your system has most likely been configured by them, and they should have the best idea of what hardware and software your system contains. Furthermore, if you purchased your system from a dealer near you, you can bring your system to them to have it serviced instead of attempting to do so yourself (which can have expensive consequences).

Help Resources:

1. See the beep codes section of this manual.
2. See the TYAN website for FAQ's, bulletins, driver updates, and other information: http://www.TYAN.com
3. Contact your dealer for help BEFORE calling TYAN.
4. Check the TYAN user group: alt.comp.periphs.mainboard.TYAN

Returning Merchandise for Service

During the warranty period, contact your distributor or system vendor FIRST for any product problems. This warranty only covers normal customer use and does not cover damages incurred during shipping or failure due to the alteration, misuse, abuse, or improper maintenance of products.

NOTE: A receipt or copy of your invoice marked with the date of purchase is required before any warranty service can be rendered. You may obtain service by calling the manufacturer for a Return Merchandise Authorization (RMA) number. The RMA number should be prominently displayed on the outside of the shipping carton and the package should be mailed prepaid. TYAN will pay to have the board shipped back to you.

Notice for the USA
Compliance Information Statement (Declaration of Conformity Procedure) DoC
FCC Part 15: This device complies with part 15 of the FCC Rules

Operation is subject to the following conditions:

This device may not cause harmful interference, and
This device must accept any interference received including interference that may cause undesired operation. If this equipment does cause harmful interference to

radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and the receiver.
Plug the equipment into an outlet on a circuit different from that of the receiver.
Consult the dealer on an experienced radio/television technician for help.

Notice for Canada
This apparatus complies with the Class B limits for radio interference as specified in the Canadian Department of Communications Radio Interference Regulations. (Cet appareil est conforme aux norms de Classe B d'interference radio tel que specifie par le Ministere Canadien des Communications dans les reglements d'ineteference radio.)

Notice for Europe (CE Mark)
This product is in conformity with the Council Directive 89/336/EEC, 92/31/EEC (EMC).

CAUTION: Lithium battery included with this board. Do not puncture, mutilate, or dispose of battery in fire. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used battery according to manufacturer instructions and in accordance with your local regulations.

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